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Teachers' Perceptions of the Benefits and Barriers About the Use of Technology Within Individual Classrooms

Jodi Head

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TEACHERS' PERCEPTIONS OF THE BENEFITS AND BARRIERS ABOUT
THE USE OF TECHNOLOGY WITHIN INDIVIDUAL CLASSROOMS

DISSERTATION

By

Jodi Head

Submitted to the faculty of the
Consortium of Columbus State University
In Partial Fulfillment of the Requirements
For the Degree of Doctor of Education
In Curriculum and Instruction

Columbus State University
Columbus, Georgia

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Teachers' Perceptions of the Benefits and Barriers about the Use of Technology within
Individual Classrooms

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VITAE

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ABSTRACT

This study evaluated teachers' perceptions of the use of technology within individual classrooms and how benefits and barriers in education affect their beliefs. The researcher conducted the study within a public, elementary school within the state of Georgia. A mixed methods approach was used to conduct the research, in order to collect the data. The quantitative method used was a Likert-type survey that was submitted to the researcher anonymously. The qualitative method used was a single, focus group with the participants that took part in the survey. They were asked a series of questions that pertained to the survey results. The data was analyzed and several conclusions were formed based on this information. Participants felt that the benefits and barriers play an equal role when using technology within the classroom. Although the benefits overpowered the barriers and were perceived to have more influence among the participants.

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CHAPTER I

INTRODUCTION

General Introduction

From the early inventions of the 1900s, man toyed with technology creations in order to improve them for consumers. In working to perfect their designs in creating a better masterpiece, inventors and engineers remain in mode to develop a better tool. In return, the creation of new and improved versions of computers, tablets, smart phones, mobile devices, and infrastructure manipulations lead to consumer consumption. These consumers fall in to many categories from the corporate world, household entities, and educational facilities.

The educational facilities were transformed in the 1990s when personal computers and the introduction of the internet became available for learners (Brenner & Brill, 2016). This new development changed the way instructional technology might be used in the K-12 classroom. The federal government announced Preparing Tomorrow's Teachers to Use Technology (PT3). This initiative provided technology, professional development, curricular change, and incentives to teacher education programs. PT3's multi-million dollar calculated expenditures changed teacher education programs, but the impact of PT3 within educational facilities remained unknown once the participants were awarded employment (Brenner & Brill; Hsu, 2016).

Since PT3, there have been many initiatives that focus on the improvement of teacher development focusing on technology integration. The International Society for

Technology in Education (ITSE), National Educational Technology Plan, and State Educational Technology Directors Association (SETDA) have called for a need to

provide more training to develop 21st century skills among teachers (Brenner & Brill, 2016; Hsu, 2016). The National Educational Technology Plan went as far to declare that the training should focus on “professional learning that is collaborative, coherent and continuous and blends more effective in-person courses and workshops with the expanded opportunities, immediacy and convenience” (Hsu, p.10). With continuous advancements in technology, policy reform, and national reports, the community of stakeholders from all aspects of the corporate and education worlds continue to progress to accommodate the change and stay abreast of the new developments. With these improvements to technology, school district officials must provide the most recent and up-to-date versions of these tools for 21st century skills and 21st century learners.

In supporting these learners and teachers of innovation, we prepare our students for a technology-based workforce (Lemke, 2010). As school district administrators seek ways to provide these learners with paramount experiences using technology, the faculty and staff of schools must be equipped to handle this transition from old to new devices (Inan & Lowther, 2010; Shapley, Sheehan, Maloney, & Caranikas-Walker, 2010). Research shows that teachers that are exposed to training and support in using these devices in the classroom have reduced levels of internal barriers and begin to expose some benefits in using this style of instruction (Coleman, Gibson, Cotton, Howell-Moroney, & Stringer, 2016).

With these 21st century skills and learners, teachers and administrators seek to be well-informed in order to provide stakeholders with the new and upcoming devices to learn within schools. In order for students to receive this style of instruction, teachers should be equipped with cutting edge devices and materials with professional

development that prepares them for instructional practices (Inan & Lowther, 2010; Shapley, Sheehan, Maloney, & Caranikas-Walker, 2010). With this type of instructional style of teaching with devices, teachers will encounter barriers that will cause resistance (Brenner & Brill, 2016; Carver, 2016; Gündoğdu, Silman, & Ozan, 2011; Hsu, 2016; Kazu, 2011; Kurt & Ciftci, 2012; Magen-Nagar & Peled, 2013). With these barriers in mind, there are still many benefits to using technology in a classroom setting (Brenner & Brill, 2016; Carver, 2016; Ritzhaupt, Dawson, & Cavanaugh, 2012). The teacher plays a major role in identifying these benefits and barriers.

According to Oxford's Dictionary (2017) barriers create, "circumstances or obstacles that keeps people or things apart or prevents communication or progress". In education, some barriers have been identified as the availability of existing technology, amount of technology, location of technology, lack of time to devote to the creation and implementation of technology integrated lessons, technical support, teacher knowledge and skill, students' lack of technology skills, lack of professional development, lack of software available connectivity issues, evolution of the equipment, and lack of administrative support (Brenner & Brill, 2016; Carver, 2016; Coleman, Gibson, Cotton, Howell-Moroney, & Stringer, 2016; Domingo & Gargante, 2016; Hsu, 2016; Preston et al., 2015; Yesilyurt, Ulas, & Akan, 2016; Young, 2016). These are some of the barriers that cause teachers frustration and lack of urgency in implementing a classroom that is implementing technology to its full potential. Then, benefits that allow teachers to perform the desired, integrated technology curriculum provide an optimistic view.

Benefits create "an advantage or profit gained from something" (Oxford, 2017). Some of these benefits in technology integration into academic content look like

increased student engagement, increased student achievement, method of differentiation, opportunity to work on researching skills, provides more current content information, creates a more flexible learning environment, promotes collaborative learning, saves time and effort, helps me organize my work, promoted teacher-student-parent communication, promotes creativity and self-expression, and improves retention rate (Brenner & Brill, 2016; Carver, 2016; Coleman, Gibson, Cotton, Howell-Moroney, & Stringer, 2016; Domingo & Gargante, 2016; Hsu, 2016; Preston et al., 2015; Yesilyurt, Ulas, & Akan, 2016; Young, 2016).

The benefits and barriers arise in any situation that creates uncomfortably and unpredictable circumstances. How we deal with these benefits and barriers speaks volumes in our persistence to rectify a solution to a problem. In education, trends fade in and out, but technology remains constant in education, business, and households. The need to explore the teachers' perceived benefits and barriers to technology use at ABC Elementary School remains pertinent, in order to create a plan of action that meets the needs of all teachers within this learning environment.

Statement of the Problem

In education, teachers are given many variables to implement and juggle within an academic school year. The integration of technology within instruction is one variable that remains constant throughout the pendulum of change in education. The term technology integration has a broad meaning for many educators and administrators. There is not a set integration technique that fits all educators and students. Thus, the need for an evaluation of Georgia educators at ABC Elementary School that assesses the use of technology within individual classrooms through the use of a survey. Based on the

evaluation of their usage, the teachers' perceptions of the benefits and barriers of technology usage will be discussed with the participants to examine the possibility of a relationship between these variables. This evidence will be made aware through teachers partaking in a focus group at ABC Elementary School after the survey is complete.

With the increased emphasis on Science, Technology, Engineering, and Mathematics (STEM), student-centered learning, and research-based instruction, technology plays a role in all of these initiatives and instructional frameworks. Hence, technology is here to stay and is evolving daily for all in the education field. There are new programs, software, and devices to learn each year in order to stay well-informed of the educational technology that teachers are expected to incorporate into their lesson plans.

With technology, 21st century standards and technology requirements of teachers evolving every year, there is a continual promise that holds true for technology and the affect it has on teachers. The need to integrate technology within instructional lessons that provide learners with rigor, critical thinking, and problem-solving opportunities is vital with the digital natives present within our schools. Researchers explore and confirm the belief that technology provides multiple benefits for educational institutions that include providing students with a rich, learning environment. Along with those benefits, also lies barriers that deter educators from implementing technology in the classroom setting for instructional purposes. The need to explore the benefits and barriers of teachers in ABC Elementary School is the variable that needs more attention, in regards to the innovation of technology that plays a dominant role in the delivery of academic content areas within education. Limited information is known about the way teachers in

this school perceive technology usage, and the benefits and barriers that are exhibited by teachers and students utilizing this form of instruction throughout an academic school year within individual classrooms.

Research Question

Researchers claim that technology use benefits education and causes barriers for teachers, so this project will examine these factors within an elementary school setting.

Research Question 1: What are the barriers perceived by teachers in using technology within their individual classroom?

Research Question 2: What are the benefits perceived by teachers in using technology within their individual classroom?

Research Question 3: To what extent do teachers perceive a relationship between technology barriers and benefits within their individual classroom?

Conceptual Framework

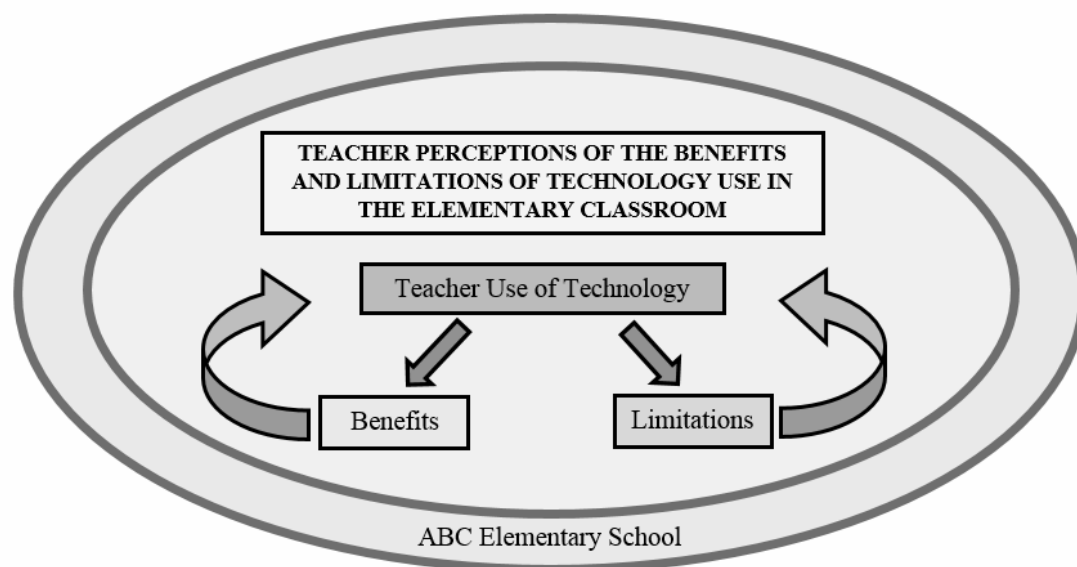
With technology integration, there are many facets that must be evaluated in order to resolve at a collective description of the technology usage and perceptions about the benefits and barriers provided with this form of instruction. The pieces to this framework are related, and could possibly correlate to one another. First, the usage of technology by the teacher is a factor that will be examined as to what level of utilization the teacher feels comfortable with on a regularly, frequently, occasionally, rarely, and never basis. The usage of technology by the teachers at ABC Elementary School will vary from novice to expert, but the level of usage will determine the perception of the benefits and

barriers associated with the equipment. While having a plethora of equipment and programs are ideal, the teacher must know how to utilize it into the curriculum.

While having a classroom full of educational technology is beneficial for students and teachers, it is important for administrators and district personnel to act responsibly when purchasing the correct material for student use in the classroom. There are devices, programs, apps, and software galore that serve an educational purpose, but one could become overwhelmed with the selection that is available for educational technology. The most useful educational technology provides the learner with the most productive time spent on devices in the classroom. While the type and number of educational technologies are important, the benefit using these devices are more important.

The benefits and barriers will be assessed from the viewpoint of the teacher. The teacher is engrossed in the trenches where they are implementing these initiatives. Although there have been many studies examining the benefits and barriers of using technology in the classroom, the teachers must reap the benefits for themselves. This reverts back to the relationship among the three variables: the usage of technology among teachers, the barriers associated with technology usage, and the benefits of implementing a curriculum that involves technology. All three of these variables affect individual teachers in various ways. Each one will have their own perception of what they feel makes the most prevalent impact on the learning process. While the three variables may or may not correlate with one another, they relate to the perception that the teacher places on the use of technology in the elementary classroom.

Figure 1. Conceptual Framework of this Study



While these three variables may or may not correlate or have an influence on the perceived benefits or barriers to using technology within the classroom, the EDUCAUSE survey research questions will take all of these variables and assess them in accordance with the usage that educators partake in during instructional delivery. The EDUCAUSE is a system that will combine all evolving people, processes, organizations, and challenges in integrating an instructional technology framework that is compatible to all learners (EDUCAUSE, 2017). These components will assist in the decision on how to help those that lead, manage, and use technology to determine where an educator exhibits a sufficient or an insufficient skill set in order to fulfill the responsibility of developing a 21st century learner.

Importance of the Study

The research questions posed within this study seek to analyze teacher perceptions of the benefits and barriers of this usage within the classroom and the possible relationship between the usage of technology components within the classroom in regards to the teachers' perceptions of the benefits and barriers of the usage. The results of this study will be important to inform the selected school within the State of Georgia of the perceived benefits and barriers of technology by teachers based on the usage within the teacher's individual classroom. The importance of this study remains to increase awareness of using technology in various modes within an elementary classroom that affects the teachers, the students, and the field of education. This study will allow educators to express their level of comfort and need in implementing technology within the classroom effectively. The awareness gained by educators will provide educators, administrators, and district level employees with a broad picture of the levels of concern that need to be addressed in order to provide educators with the appropriate support needed to implement instructional technology within academic curricula successfully. Dewey (1916) emphasized the importance of this study perfectly stating, "If we teach today as we taught yesterday, we rob our children of tomorrow" (p. 36).

With increased awareness of the educator's level of comfort, perception, and usage established about instructional technology, the selected school in Georgia will allow teachers to express their expertise of implementing this type of instruction with fellow teachers, administrators, and district level employees. The goal is to utilize the awareness and results of this study to provide educational facilities access to training and professional development opportunities that are tailored to their school's specific needs.

These specific needs will vary based on school demographics. In learning the comfort levels of the users and stages of concern in implementing technology successfully within the classroom, schools will be able to provide students with engaging lessons.

Educational facilities will be able to meet their teachers where they are within their comfort levels and build upon their foundation to gain insight in providing learners with dynamic lessons that incorporate instructional technology in a meaningful manner.

As teachers become more aware of their level of usability and reflect on the benefits and barriers of utilizing instructional technology within the classroom, the students will begin to reap the profits of their teacher's search for integration of this form of learning. Students are driven by engaging lessons and hands-on exploration that allows them implement the use of technology. Students learn how to manipulate and operate technology devices at an early age, so it only seems reasonable to partake in an educational delivery that most students can relate to today.

As teachers determine their comfort level in implementing instructional technology and students use this form of lesson delivery and engagement to maximize their learning, the field of education will benefit by producing students that have developed 21st century skills and employed their expertise in the creation of their course work. Education no longer should consist of rows of students listening to a teacher lecture for hours. Instead, education should involve educational technology that relates to real life operations and problems that exist in their community. Academic curriculum in education should not revolve solely around technology integration, but it should reflect an up-to-date instructional framework that incorporates these tools and devices when appropriate for the learner.

Procedures

The method of research implemented for this project was an extensive review of available literature from past to present. Galileo, EBSCO Host, and Google Scholar were all employed in the discovery of relevant research material. A collection of peer-reviewed articles dealing with the content under review were analyzed for comparisons and contrasted for differences in content. This material lead to the selection of the research design and procedures needed to fulfill this project.

The procedures suggested by the researcher will consist of a mixed methods research design. This will include a Likert-type survey and a single, focus group session. The survey will consist of a set of scenarios that the teachers will read and decide upon their level of technology usage and the benefits and barriers in this usage within their individual classroom. The survey will rank these benefits and barriers of technology usage on a strongly agree, somewhat agree, strongly disagree, and somewhat disagree. Once the teachers complete their survey, a focus group will be assembled in order to discuss their results in the form of strategic, focus group questions that will attempt to derive at a relationship or not between the utilization of technology use of teachers with the perceived benefits and limitations experienced in the classroom.

Within ABC Elementary School, there is a target population of 24 teachers that will be used for this project. This population of teachers will consist of four teachers per grade-level in kindergarten through fifth grades. All teachers will participate in the survey portion of the research study. Once the survey results are analyzed by calculating the mean score of each survey question, a purposive sampling of the teachers will be invited to participate in a focus group session that will expand upon their perceived

benefits and barriers toward the usage to technology, based on their experience in their individual classroom.

Limitations

This research project will take place within the ABC Elementary School which is identified by its Georgia school district as a technology magnet program for students in grades kindergarten to fifth grade. These students have technology standards that were adopted from the ITSE program and participate in multiple, technology-based programs that are led by the classroom teachers. With this responsibility managed by the classroom teachers, the level of technology usage needs to be evaluated to assess their competency in delivering these requirements.

In order to evaluate the individual competency level of each teacher in technology usage, they must be identified on the surveys, adopted from EDUCAUSE. In identifying individual teachers on the surveys, some may be reluctant to answer questions honestly. In order to prevent reluctance among teachers, the surveys and focus group recordings will be password protected by the researcher. Teachers will receive assigned numbers in order to stay unidentified for this project.

Definition of Terms

The following terms are used throughout this research project. An explanation is provided for a detailed account of the terms.

technology: For this study, this term refers to any device that attempts to solve problems, communicate, or publish items identified by another source.

21st century learners: This term refers to a learning society that creates lifelong learners of a K-12 educational framework that provides opportunities that are different than any traditional learning community (USDOE, 2014).

integration of technology/technology integration: This term refers to the incorporation or use of any technological device or program for educational purposes.

Science, Technology, Engineering, and Mathematics (STEM): STEM refers to a style of teaching that incorporates science, technology, engineering, and the mathematics that is associated with careers that exude those same characteristics (USDOE, 2014).

student-centered learning: This term refers to a style of learning where the student determines what to study, how to study it, where to study it, and when to study it (USDOE, 2014).

Bring Your Own Device (BYOD): This term refers to students that bring their own technological device to use for classroom instruction based on teacher guidance.

elementary classroom factors: For the purpose of this study, this term refers to items within a classroom that are used as a computerized device for educational purposes.

qualitative research/qualitative approach/qualitative framework: This term refers to a narrative interpretation of data analysis for a research study (Teddlie & Tashakkori, 2009).

Teacher Keys Effectiveness System (TKES): TKES serves as the evaluation system for the State of Georgia that critiques a teacher's performance based on a set criteria or standards (GADOE, 2015).

Title I: This term is a federal grant under No Child Left Behind that allocates money to qualifying schools that have a high population of poor children that perform below average on standardized state assessments (GADOE, 2015).

Title II-A: Title II-A is a program that allocates grant money to school districts to improve teacher and principal quality (GADOE, 2015).

Special Local Option Sales Tax (SPLOST): This term refers to a tax that adds a certain amount to items purchased within the county that is voted upon by citizens of a community.

Amount of Existing Technology: This term refers to the amount of functional technology that is available for use within the building.

Amount of Technology: This term refers to the numerical amount of technology available within the building for use by teachers and students.

Location of Technology: This term refers to the physical location where technology can be found within the computer labs and classroom settings.

Technical Support: This term refers to the assistance provided to school personnel by the contracted technology companies and/or the department of information services with the school district. They are contracted to provide help when purchased products do not want to cooperate with users.

Connectivity Issues: This term refers to the communication between the computer and the internet modem or access point that provides the user with the opportunity to surf the World Wide Web.

Professional Development: This term refers to the specialized training provided to educators on concepts that deal with a variety of topics that meet their professional needs.

Evolution of Equipment: This term refers to the amount of time a particular piece of technology has functional within the school.

Administrative Support: This term refers to the support, guidance, and acceptance provided by the administrators present within the school building and school district.

Student Engagement: This term refers to the level of passion associated with the curiosity and motivation for learning displayed by the student above the normal expectation.

Student Achievement: This term refers to the amount of academic content a student learns within a given amount of time.

Differentiation: This term refers to the various learning techniques and lesson manipulations implemented by the teacher in order to meet the academic needs of the students within their classroom.

Flexible Learning Environment: This term refers to the choice in learning method the student desires when learning and displaying academic content.

Collaborative Learning: This term refers to small group setting that students work in to accomplish an assigned task given to them by the educator.

Retention Rate: This term refers to the student's ability to recall academic information taught to them by the educator at any given time.

Summary

The benefits and barriers of technology use within an elementary setting are evident based on research obtained for this project, but the usage of technology within individual classrooms is not clear at ABC Elementary School. The perception obtained by elementary school teachers will highlight benefits and barriers based on their usage of technology within their individual classrooms. The end result is to gain knowledge of the

perception of teachers' usage of technology within their individual classrooms. This information ultimately will be used to assess current plans of action and make adjustments.

CHAPTER II

REVIEW OF LITERATURE

Introduction

Education revolved around the apprenticeships of the daily role of the person that occupied space within a household. People were taught to grow and harvest crops, sew clothes, and build goods. Early 21st century roles and responsibilities of families are vastly different from the past. The role and responsibility of children is to obtain a college degree and well-paying job for future status. That future now consists of computerization in more areas of the work force when in previous years word processing capability was the intended purpose (Frey & Osborne, 2013).

With the presence of technology dating back to centuries ago, there still seems to be some resistance among classroom teachers incorporating it into the learning process, and researchers discovered that the majority of elementary school teachers used computers to do administrative tasks and not as an integral part of the student learning process (Kurt & Ciftci, 2012). According to Anthony (2012), technology integration in actual classrooms remains a perplexing challenge. Some of those challenges include technological literacy, constructivist beliefs, lack of material, useful software program to support learning, and perceived usefulness of technology (Anthony; Kazu, 2011; Brenner & Brill, 2016; Carver, 2016; Hsu, 2016; Kurt & Ciftci).

Technology in America

History of Technology. Technology has evolved over the years and serves various functions in homes, businesses, and educational facilities. Although the design and

functionality is more complex, technology still serves a common goal of communication and production. In 1939, Hewlett Packard was founded in a garage (Computer History Museum, 2015). During the year of 1958, the SAGE Operating Station was published online. In 1962, the Card Random Access Memory (CRAM) was introduced for memory and storage solutions. As the 1970s arrived, the Silver Arm was invented to perform small part assembly with programming. The 1980s represents the launch of Apple computer's Macintosh. In 1995, Java was introduced to the world, and IBM released their first ThinkPad. The year, 2000, announced the first camera phone. In 2013, a subscription-based software product was announced from Microsoft, Office 365 (Computer History Museum).

United States Department of Education Initiatives. The United States Department of Education (USDOE) recognizes that the vast array of technological advances have the potential to bring remarkable possibilities for teaching and learning while engaging students in more fascinating ways (USDOE, 2014). The power of technology is endless in dealing with student learning. With this realization, there is also those that identify the need to equip teachers and principals with support networks that prepare them in implementing technology that best meets the needs of students to increase student achievement and engagement (USDOE).

Although equipping schools with technology sounds nonnegotiable, the efficiency commences when school districts supply schools with internet speeds that support learning today. In schools, less than a third of teachers state that their school's internet speed meets their needs for daily instruction (USDOE, 2014). There is also a staggering 91% of teachers that are equipped with the technology within their classrooms, but only a

quarter of those teachers reported that they have the training necessary to utilize the devices in their classrooms to their full potential. With this acknowledgement, the Obama administration created a five year plan of action that states that 99% of schools will have high speed internet and wireless capabilities to meet the needs of their students (USDOE). This movement also promises professional development for school staff to ensure that they have a grasp on their ever changing technological demands on the education world. Through funding sources of the Elementary and Secondary Education Act, school districts will be guaranteed this opportunity.

Partnerships with the Elementary and Secondary Education Act and 50 other organizations allow the USDOE to promote the Future Ready Initiative. Under this initiative, Future Ready schools take a pledge that ensures they will commit to the goals and responsibilities of becoming a Future Ready School (FRS). The FRS status provides school districts and schools the broadband internet connectivity and wireless internet access to promote student learning through the use of engaging activities with 21st century learning apparatuses (USDOE, 2014).

The FRS is divided into two plans (USDOE, 2014). One plan focuses on reimagining the role of technology in education, and the second deals with building a technology infrastructure for learning. The bottom line is making sure that students have devices that function and connect to outside resources that impact student learning. The National Education Technology Plan (NETP) serving as one of the participating organizations would like to see this plan for children divided into five categories (USDOE). These categories are dependent upon one another in satisfying a collective plan of changing the face of technology in education.

Learning, teaching, leadership, assessment, and infrastructure are all key components that mesh together to create the NETP Future Ready School Initiative. Learning concentrates on using the technology to transform the way educators teach on a daily basis while providing the students with equity and accessibility within the classroom. When carefully designed and thoughtfully applied, technology can accelerate, amplify, and expand the impact of effective teaching practices (USDOE, 2014). Teaching should be technology-rich and full of opportunities to apply their knowledge in ways that differ from the traditional pencil and paper form. Leadership plays a crucial role in the development of this plan. The leadership in the building serves as the liaison of the plan that encourages the adoption of this suggested technology vision. Assessment serves as a technology piece that provides administrators, educators, parents, and the learner a snapshot of how they are performing in class. It offers all parties a faster delivery of academic information to intervene to correct concerns. Finally, the last category contained within an infrastructure that supports the engagement and access to technology developed activities that allow students to create, design, and explore possible avenues of a college and career ready citizen.

State of Georgia Technology

History of Technology. The State of Georgia has been given and has given millions of dollars to update existing infrastructure. The state has not been given any allocations to purchase equipment for students and teachers. In 2014, the state required all counties to become online assessment fluent on a minimum of 30% of their machines (C. Shealy, personal communication, March 3, 2016). Within the same year, the state

provided school systems seven million dollars to update their infrastructure for the K-12 network.

In 2015, the state upgraded to a new K-12 network that provided each school 100 megabytes of speed. This was increased from 15 megabytes. Additionally, the state contributed \$37 million for classroom connections under the new K-12 network to increase bandwidth (C. Shealy, personal communication, March 3, 2016). In May 2015, the state was allocated \$25 million for the fiscal year of 2016 from the federal government to apply for their e-rate application. To complete the e-rate initiative from the federal government, that state was awarded \$8.2 million in grant money to complete the project (C. Shealy, personal communication).

Technology Recommendations. The State of Georgia does not support the recommendation of any technology program, software, or device. The only recommendation the state addresses with technology is the systems required in order to conduct online assessments. DRC Insight manages the testing capabilities for the state. The state does however recommend that school districts create a three-year technology plan that constitutes transparency, budgeting, and potential grant opportunities. As of 2013-14 school year, technology plans were not required by the state.

Muscogee County Technology

Technology Plan of Action. The Muscogee County School District (MCSD) operates on a three-year technology plan. The most current plan ended June 2015 with progress for a new plan is underway. This plan is divided into eight sections that cover the following topics: planning, student needs, technology mission and vision, current

reality, gap analysis, goals and benchmarks, action plan, and communication and marketing plan (MCSD, 2015).

The technology planning highlights the improvements made since 2004 and the approval of the Special Purpose Local Option Sales Tax (SPLOST). The SPLOST raised \$223 million and \$48 million of that money was earmarked for technology needs, both administrative and instructional (MCSD, 2015). This money was used to install and refresh computers to bring classrooms up to the 21st century standards.

The student needs' section concentrates on disseminating data received from state-mandated assessments. These needs were compiled into the newly created Student Longitudinal Data System (SLDS), which was a state initiative that houses all student data from the beginning of a student's career in public education until their graduation date from high school (GaDOE, 2015). This system consolidates all student information, including assessment, curriculum, and student information, and allows teachers and administrators to monitor student progress, perform a gap analyses, and guide classroom instruction to better meet the needs of individual students (MCSD, 2015).

With the students' needs in mind, the district created the mission and vision for the county.

The vision is defined as being committed to providing a technology-rich environment for every student and employee because:

- Technology facilitates innovative designs for teaching and learning including authentic experiences, real-world simulations, immediate information access, and increased teacher/student interaction.

- Technology enables every student and employee to become active, responsible, motivated, and productive.
- Educators have a professional responsibility to model effective use of modern technologies.
- Technology improves efficiency, organization, productivity, and communication.
- The use of technology responds to the needs and expectations of parents, students, teachers, business, and the community at large.
- Technology is an integral part of modern culture (MCSD, 2015, p. 17).

The vision of MCSD highlights the mission while focusing on the access to technology and providing all students and educators an array of opportunities.

The current reality of the technology available within the school district examines annual inventories provided to all students and employees. The inventories consist of a GaDOE interest inventory, along with a survey provided by the district to all employees. Once the data is disaggregated from both inventories, the results are analyzed by the chief information officer to devise a plan of action for purchasing technology. The plan is then presented to the superintendent and board of education for approval.

After the current reality of the school district is assessed with inventories of technology, the district uses this information to satisfy on-demand needs throughout schools. Expansions and renovations of buildings must be taken into consideration when exhausting the SPLOST account for technology additions. E-rate awards, SPLOST, general budget, federal and state entitlement programs, and grants are used to aid in filling technology needs too (MCSD, 2015).

Goals and benchmarks were compiled after an extensive series of meetings with all stakeholders and rely on the initial development of the District's Strategic Goals (MCSD, 2015). All goals are assigned to a timeline with yearly processing benchmark numbers. The goals are also assigned to a specific department for completion of the project.

The action taken by the district after the goals are established and assigned is comprised of professional development to meet the needs of the goals set by the committee. The district conducts system and school-based development that is aligned to the articulated goals and purposes, data driven, research-based, evaluated to determine impact, aligned with adult learning theory and best practices, and collaborative in design and implementation (MCSD, 2015). This professional development is offered to staff members through the use of Instructional Technology Specialists (ITS). These ITS members conduct system-wide and school-based professional development. When ITS professionals conduct school-based development, it is based on the school-by-school basis as reported in School Improvement Plans (SIP).

After all components of the plan are addressed through the delivery of previous sections, the communication and marketing of the results and programs in place throughout the school district are advertised for all stakeholders. The school district uses various mediums in order to accomplish this goal. The school district's website, newspapers, television, and email media are used to disseminate the information to all community members. After exhausting all communication outlets, the school district encourages broader stakeholder involvement in helping students achieve academic standards.

Devices and Equipment Available. Within the MCSD, based on the technology inventory from GaDOE (2015), there are a total of 26,099 computers which equates to 1.21 computer ratio per student in the district. Out of those computers, 35.4% are 5 years old or older (MCSD, 2015). Teachers are equipped with a laptop computer with SMART Board capabilities for instructional purposes, which means that all classrooms in the school district have SMART Boards. Other technological devices depend and vary per school based on individual site funding from Title I, Title II-A, and other state and federal programs.

Software and Programs Adopted. The MCSD has programs that are approved to be utilized on any device purchased with monies of the district (2015). The only two programs that are adopted and mandated to implement with fidelity are the reading and math adoptions that have technology components that are required by the superintendent. While these programs are driven by the academic content, the technology must be up-to-date in order to employ these series effectively.

Technology Readiness

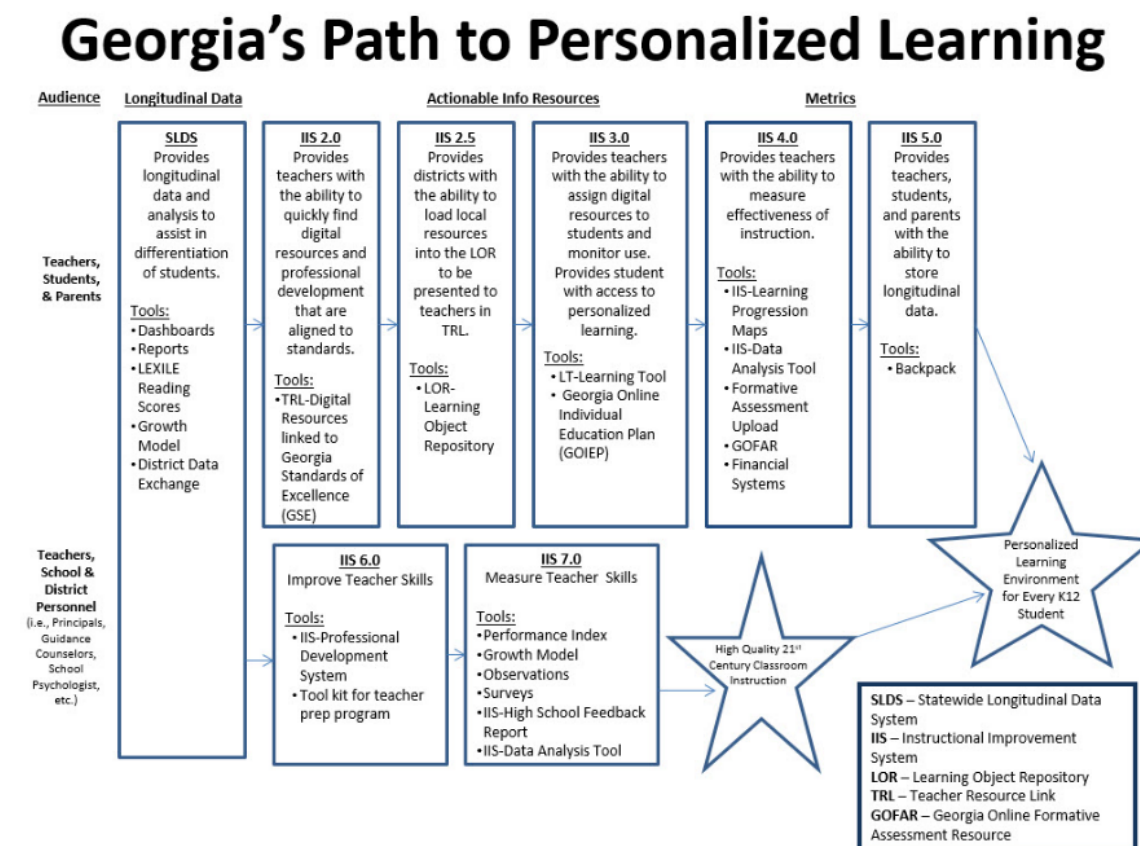
Readiness in general refers to the capability of being ready or prepared for some degree of change or upgrade. In 2012, the State Educational Technology Directors Association (SETDA) released a report that outlined details on how school districts could become equipped for College and Career Ready in Teaching, Learning, and Assessment. With the continued transition into implementing the Common Core State Standards in some states, districts will be updating their assessment systems to prepare for the Common Core aligned assessments based on input from two multi-state consortia – the Partnership for the Assessment of College and Career Readiness (PARCC) and the

Smarter Balanced Assessment Consortia (SBAC). In preparing states and school districts, SBAC published some goals that could serve as guidance in preparing educators for the future of technology instruction and assessment. These goals include: learning digitally, digital testing requires that educators must expose students to learning in this manner, instructional goals for school districts must be long-term in planning for technology enhancements, and infrastructure considerations for broadband speed should be prioritized high on the list of needs to accommodate teaching, learning, and assessment (SBAC).

State. In Georgia, technology readiness is expressed in the form of many programs. Some of these programs include Georgia's Path to Personalized Learning, Data Collections, Georgia Virtual Learning, Infrastructure, Instructional Technology, and Georgia's Online Clearinghouse (GaDOE, 2015). These programs are comprised of many facets that facilitate the use of technology within school districts in Georgia.

Georgia's Path to Personalized Learning and data collections are accessed simultaneously through the State Longitudinal Data System (SLDS) and Infinite Campus (IC) (GaDOE, 2015). This information provides educational facilities with pertinent information about students located in their school district. The system provides administrators and educators with access to information and tools that are necessary to assist in the academic protocol for all students to be successful (GaDOE).

Figure 2: Georgia's Path to Personalized Learning (GaDOE, 2015).



Georgia's Virtual Learning is comprised of several learning apparatus that use digital elements to create a 21st century experience for students. The vision states that these programs “serve as a stimulus to dynamic change by providing quality digital programs to strengthen teaching and learning” (GaDOE, 2015). The Georgia Virtual Learning community is comprised of the Georgia Virtual School and the Georgia Virtual School Credit Recovery Program. Students that are limited from attending school on a face-to-face basis are provided with the same educational opportunity at home via these programs.

The infrastructure is a data center that focuses on the maintenance and functionality of all operating systems for the State of Georgia. This care is maintained by the GaDOE and is funded through e-rate monies (2015). The e-rate program is federally

funded and requires state level officials ensure that telecommunications and internet activity is functional in all public school facilities (GaDOE). This program also mandates that systems have technology planning every three years at the state level to guarantee comprehensible, operative use of federal, state, and local technology funds (GaDOE). Finally, the infrastructure consists of one final piece to the components of technology readiness. The State K-12 Network was established in 1996 (GaDOE). Since the creation of this program, the e-rate program has allowed the state to provide all public school systems with 3 MPBs of bandwidth for each school in 194 school districts (GaDOE).

Along with the data and operating systems, the State of Georgia is upgrading their instructional technology capabilities to ensure the most current experience for all students (GaDOE, 2015). The Division of Instructional Technology for Georgia consists of a variety of divisions that “work collaboratively with the offices of the GaDOE, Georgia’s Regional Educational Service Agencies (RESAs), and Georgia’s Local Education Agencies (LEAs) to support the improvement of student achievement and effective, job-embedded professional learning” (GaDOE). In working with these agencies, the GaDOE created a team to serve proactively in offering support for Georgia technologies, GaDOE Instructional Technology Training Team. This team has fostered the adoption of Georgia NETS (National Educational Technology Standards) Implementation (GaDOE). The NETS-S (Students) are aligned with the K-8 academic scope and sequence for Georgia adopted by GaDOE in 2011. These instructional technology standards are incorporated into projects that maximize the use of the Georgia Standards of Excellence (GaDOE). This team has also partnered with GaDOE Technology and Facilities Services Divisions to build a Center for Classroom Innovation (CCI). This facility hosts LEAs in order to

provide them with a model classroom experience that integrates technology in a manner that develops 21st century skills (GaDOE).

As part of a technology readiness plan and in compliance with the E-rate program from the federal government, Georgia submits a three-year technology plan and system-wide technology inventories (GaDOE, 2015). The three-year technology plan consists of improvements to make Georgia public schools equipped to engage 21st century learners. Technology inventories are submitted to the state level for all public schools within Georgia. This inventory guides the planning of instructional equipment in and out of the classroom.

District. A school district that is technology ready is constructed based on two principles (Anthony, 2012). These two principles revolve around the leader's and the teacher's involvement to implement technology that ensures readiness on the district level (Anthony). Anthony suggests that the readiness plan consists of two components: "the system of technology planning that district administrators and technology leaders typically carry out and the system of technology integration that teachers enact in their classrooms" (p. 339). The district's readiness can have profound outcomes on the use of technology within the classroom, if district-level administrators are not proactive in their identification of learning challenges for tomorrow's schools (Anthony).

Teacher. A study by McKnight et al. (2016) concludes that digital learning compared to traditional learning has yet to show any significant student benefit, but the reason stems from the teachers' readiness and pedagogical awareness on how to integrate these technological tools. The focus cannot be the use of technology (McKnight et al.). The focus must shift to "using technology to remodel learning routines, cognitive

processes, problem solving, and teacher roles, our schools can realize the promise of technology to transform learning” (McKnight et al. p. 5). In order to accomplish this goal, a teachers’ readiness must be accessed to determine their strengths and weaknesses (Badri, Rashedi, Yang, Mohaidat, & Hammadi, 2014; Parasuraman, 2000).

Teacher readiness for technology is measured by using the Technology Readiness Index (TRI) (Badri, Rashedi, Yang, Mohaidat, & Hammadi, 2014; Parasuraman, 2000). This TRI “measures the consumers enduring propensities to embrace new technology” (Badri, Rashedi, Yang, Mohaidat, & Hammadi, p. 258). “Once this analysis has taken place, the results are recorded based on four dimensions of technology beliefs that impact an individual’s level of techno-readiness” (Badri, Rashedi, Yang, Mohaidat, & Hammadi, p. 258). These four dimensions consists of optimism, innovativeness, discomfort, and insecurity. Optimism and innovativeness refer to the teacher’s readiness level in using technology in the classroom setting with students (Badri, Rashedi, Yang, Mohaidat, & Hammadi). After evaluating the readiness level of teachers, administrators have a clearer picture of how to address the readiness levels of the faculty and staff (Summak, Bağlibel, & Samancioğlu, 2010).

In order to arrive at this destination of true readiness, teachers need high quality professional development (Inan & Lowther, 2010; Shapley, Sheehan, Maloney, & Caranikas-Walker, 2010). This professional development suggests that teachers need assistance with basic skills for classroom instruction (Shapley, Sheehan, Maloney, & Caranikas-Walker). Shapley, Sheehan, Maloney, & Caranikas-Walker also recommend that the professional development piece should offer technical support to serve as a crutch for readiness until teachers feel comfortable with their skills. Informal colleague

support and problem-based lessons and projects were suggested to practice these newly acquired skills of technology integration and use with students (Inan & Lowther; Shapley, Sheehan, Maloney, & Caranikas-Walker).

Instructional Technology Programs and Devices

The classroom is a place where learning is facilitated by the teacher using various modalities. These various modalities often occur in a more traditional way with lecture-style presentation with limited visuals for students (Oluwatumbi, 2015). Researchers have blamed this instructional presentation mode to low and under achievement of students because of the lack of interest associated with this delivery of information (Oluwatumbi). “The use of technology in teaching becomes more important in present times because teachers also have to be able to keep up with the technological knowledge of their students” (Richards, 2014, p. 2). In order to do so, teachers use technological programs and devices in a multitude of ways (Ritzhaupt, Dawson, & Cavanaugh, 2012). These researchers describe the use of technology by teachers in two ways: (1) transforming classroom practices with hands-on application or (2) teacher-directed instructional practices using online resources (Ritzhaupt, Dawson, & Cavanaugh). Some of these online resources and hands-on applications consists of the following programs and devices: e-labs/e-classrooms, whiteboards, wikis/blogs, 1-to-1 device ratio, gaming devices, video/multimedia designs, response systems, iPads, e-books/digital literacy, software, apps, and Web 2.0.

E-labs and e-classrooms with virtual learning have become a more fundamental part in classrooms that consists of mobile learning, virtual reality, and augmented reality that has many benefits (Musawi, Ambusaidi, Al-Balushi, 2015). These benefits include

using computerized equipment to simulate laboratory experiences that traditional labs cannot accomplish today through active participation of students (Musawi, Ambusaidi, Al-Balushi). Musawi, Ambusaidi, and Al-Balushi find that the objectives of an e-lab are the following:

- Update laboratory work and its applications to keep pace with technological advances.
- Take advantage of computer in employing scientific and educational software in the educational process.
- Compensate for the shortfall in some laboratory equipment through the use of ready-made computer software.
- Help students to deeply understand scientific concepts.
- Correct many of the misconceptions held by students about science and technology.
- Develop students' positive attitudes towards the study of science and the use of technology (p. 46).

Researchers also conclude that this type of virtual learning is cost effective and safe (Herga, Grmek, & Dinevski, 2014; Musawi, Ambusaidi, Al-Balushi). E-learning allows students to synthesize the information in a more profound way (Desplaces, Blair, & Savaggio, 2015).

SMART Boards or interactive white boards (IWBs) serve a technological purpose in the classroom too. They also serve as an interactive piece that holds the attention of the students opposed to that of the lecture-style of educational delivery (Martin, Shaw, & Daughenbaugh, 2014). IWBs are highly effective during whole group instruction

allowing for all participants to engage in active discussion and questioning that sustains the attention of all learners (Martin, Shaw, & Daughenbaugh). As many educators and students favor the use of an IWB, some still are adamant about the importance of hands-on experiments and the use of manipulatives (Balta & Duran, 2015; Martin, Shaw, & Daughenbaugh).

Wikis and educational blogs are educational tools used for instructional purposes that allow students to collaborate over the web (Lee, 2012). These technological instruments allow students to manage research projects, post reading notes, publish course materials, brainstorm and refine topics of discussion, and complete writing assignments in the form of website entries, videos, and photographs to interact with their readers (Lee; Lou, Kao, Yen, & Shih, 2013). While these instructional platforms exhibit a relationship between the use of these tools and academic performance, this relationship is often challenged due to “insufficient time, a lack of access to technology which exists in some children’s homes and schools, and no administrative support in schools” (Lee, p. 90).

Larkin suggests that “a 1:1 computing environment provides students with a learner-centered approach, flexible and constructivist learning styles, and project-based/inquiry learning techniques” (2012, p. 102). One can find advantages and disadvantages to using technology within any given setting. A 1:1 research initiative reported that this type of learning increased media literacy for students, improved writing capabilities, and increased standardized test scores in some cases (Larkin). There was also reports of increased student engagement, motivation, student achievement, attendance, discipline, 21st century skills, technology skills, learning and innovation

skills, communication and collaboration skills, and self-directed learning (Argueta, Huff, Tingen, & Corn, 2011). On the contrary, this delivery reported concerns about the cost effectiveness of a 1:1 computer program along with the lack of support displayed by parents, administrators, and educational bureaucracies (Larkin).

Game play or video game technology has a negative connotation, due to the association of childhood obesity linked to this type of recreational choice made by children (Mellecker, Witherspoon, & Watterson, 2013). The attainment of knowledge through the use of video games is not a surprise due to the intrinsic motivation that the learning process holds in improving coordination, creates interactivity, fosters a challenge, and provides a reward (Mellecker, Witherspoon, & Watterson). While stakeholders are concerned with the obesity factor, gaming companies are desperately searching for a quick resolve that allows for the incorporation of physical movement due to the overwhelming evidence that supports the components of knowledge acquisition (Mellecker, Witherspoon, & Watterson).

“Clicker technology can be a powerful tool for increasing student engagement as well as providing immediate feedback” (Moratelli & DeJarnette, 2014, p. 586).

Classroom response systems, also known as clickers, provide teachers and students with instant feedback on their performance, in order to remediate or accelerate instruction (Moratelli & DeJarnette). In providing students with immediate feedback, they took an active role in their learning which improved their engagement during the academic activity (Moratelli & DeJarnette; Day, 2010). Students’ learning and engagement within the classroom will become more focused when given appropriate, timely feedback in

order to gain confidence with their experience that will motivate them to learn (Lundeberg, Kang, Wolter, delMas, Armstrong, Borsari, and Hagley, 2011).

Digital literacy and e-books/iBooks play a role in the educational technology that students are exposed too and some teachers utilize as part of their instructional practices. Their role in the technology realm of education provides the reader with a traditional text with many support features that make reading more engaging and interactive (Gonzalez, 2014; Wen, Chuang, & Kuo, 2012). This type of computerized literacy provides the students with scaffolds that assist in the reading process and are associated to Vygotsky's theory of scaffolding and zone of proximal development (ZPD) (Gonzalez). They provide the learner with the traditional trade book but with multimedia features that stimulate and engage their curiosity. These features include written text, music, sound effects, animations, highlight able text, dictionaries, and hotspots that elaborate on the picture or caption with support information (Gonzalez; Wen, Chuang, & Kuo). Some critics believe that this piece of technology could obstruct the progression of reading comprehension (Gonzalez). On the other hand, other researchers have found that e-books have contributed to the achievement of the reading process in the areas of reading comprehension, fluency, reading engagement, and ease of decoding while reading text (Gonzalez).

In addition to all of the many educational and instructional pieces of technology available today to support a 21st century learner, there are still so many more that are implemented within some classrooms. Software programs available for download, web-based programs, and applications (apps) for Android and Apple devices create a never

ending mirage of combinations that educators and students can incorporate into the learning process.

Attitudes toward Technology

“People love and hate, like and dislike, favor and oppose. They agree, disagree, argue, persuade and sometimes even convince each other” (Vogel & Wanke, 2016, p. 1). Educators are people, and some experience these same emotions about the many facets of educational design. Some of these designs are here today and gone tomorrow, but technology is here to stay. Due to the longevity of technology, some educators have strong emotions and opinions about the use of technology within the classroom.

Barriers and Stressors for Teachers. The behaviors of teachers and their attitude toward any educational device will influence their behavior when selecting the appropriate instructional strategies to implement with their students (Brenner & Brill, 2016; Hsu, 2016; Magen-Nagar & Peled, 2013). In order for technology to take precedence over other instructional strategies, the attitudes and beliefs of teachers about technology must reign supreme (Magen-Nagar & Peled). Unfortunately, there are some teachers that express a resistance to implementing and incorporating technology into their repertoire of instructional tricks.

This technology resistance stems from barriers and stressors that teachers experience within the classroom or school that hinder the successful execution of such instructional tools and devices (Brenner & Brill, 2016; Carver, 2016; Hsu, 2016; Gündoğdu, Silman, & Ozan, 2011; Kazu, 2011; Kurt & Ciftci, 2012; Magen-Nagar & Peled, 2013). These barriers and stressors include lack of availability and access, lack of knowledge and skills, teacher beliefs, self-efficacy, administrative and technical support,

crowded classrooms, socioeconomic status, and inadequate infrastructure (Brenner & Brill; Carver; Gündoğdu, Silman, & Ozan, Kazu, Kurt & Ciftci, Magen-Nagar & Peled). Researchers found that of these barriers and stressors affecting the consumption of technology within the classroom are not merely contingent upon knowledge and skill set but rather integration into the curriculum (Kazu).

The lack of availability and access refers to the number of technological devices available for teachers and students. Due to the high cost of these materials, schools struggle to supply teachers with a sufficient amount for continued, daily instructional use in the classroom (Kazu, 2011). Findings concluded that school districts and administrators balk at the idea of purchasing technology and peripherals when the mindset of the majority of teachers does not support this type of instructional approach to learning (Kazu; Kurt & Ciftci, 2012).

Another barrier that impedes on the use of technology within the classroom is the lack of knowledge and skills to incorporate this instructional framework into the curriculum (Brenner & Brill, 2016; Carver, 2016; Gündoğdu, Silman, & Ozan, 2011; Hsu, 2016; Kazu, 2011; Kurt & Ciftci, 2012; Magen-Nagar & Peled, 2013; Ziad, 2016). Some teachers express concern on integrating this type of learning and teaching into their pedagogical context because they have “limited expertise and confidence in using the hardware and software with their age group” (Kurt & Ciftci, p. 226). In addition to their skill and ability level, teachers request training opportunities and professional development that meet their needs (Kurt & Ciftci). “Professional development training to increase technology integration must be relevant to the needs of teachers. Relevance for teachers equates to student learning, so training should include assisting teachers with the

alignment of technology integration with student learning” (Potter & Rockinson-Szapkiw, 2016, p. 24).

Teacher beliefs and self-efficacy in regards to technology integration is a significant factor in adopting this style of teaching (Kurt & Ciftci, 2012). The best way to increase the chance of technology adoption from those teachers that struggle with self-efficacy is to provide them with training and support with successful learning opportunities (Bandura, 1997; Kurt & Ciftci; Magen-Nagar & Peled, 2013). Teachers that do not place a high value on technology and the integration of it within their curriculum seem to have a low self-efficacy compared to those teachers that use it on a daily basis (Hsu, 2016).

Support from administrators ranks high on barriers that prevent or limit the use of technology integration within the classroom (Gündoğdu, Silman, & Ozan, 2011; Kazu, 2011; Kurt & Ciftci, 2012; Magen-Nagar & Peled, 2013; Ziad, 2016). Some school administrators express their concern with the lack of utilization of technology software and devices in the classrooms (Kazu). Several studies confirm that the actions of the administrator have a trickle-down effect on faculty and staff, so administrators guide their own program in providing the excitement to ignite a technology rich classroom (Machado & Chung, 2015). Although administrators play a crucial role in the integration of technology, there is only so much they can do as professionals. Administrators reveal that teachers are difficult to corral into using technology due to their willingness, need for professional development, insufficient hardware, and district support (Machado & Chung).

Crowded classrooms serve as another barrier in the integration of technology. Findings show that teachers are forced to apply a teacher-centered approach to learning, which limits the student-centered activities that enable them to use technology-based lessons (Kazu, 2011; Kurt & Ciftci, 2012). Teachers rely on this approach to learning because of the space, noise, and crowd control issues that are visible in the overcrowded classrooms (Kurt & Ciftci).

The socioeconomic status plays a role in acting as a barrier to the implementation of a technology integrated school (Kurt & Ciftci, 2012). The socioeconomic status of students in various areas of the United States makes teaching with this philosophy difficult for some teachers. Teachers are faced with students that come to school from environments that are technology illiterate. This makes using this type of teaching approach unmanageable for some teachers (Kurt & Ciftci).

The final barrier discussed is the need for inadequate infrastructure for schools that provides a nuisance for teachers that want to utilize technology within their classrooms. Many administrators want to support their faculty and staff in the endeavors they wish to achieve within their classrooms with their students. Some of these teachers want to incorporate technology on a daily basis, but become frustrated with an infrastructure that cannot hold mass amounts of internet-use throughout the county or state (Kurt & Ciftci, 2012). After many attempts of failed lessons, due to infrastructure, teachers begin to revert back to the lessons that do not require those technology components (Kurt & Ciftci).

Supporters of Technology. While technology has a place with the educational forum, the purpose of these devices, programs, and apps is not to replace educators but

enhance their ability to teach (Kazu, 2011). The role and advantages to using technology within the classroom are addressed by Kazu in five ways:

- Being able to bring the real-world experiences into the classroom,
- Providing scaffolding that allows learners to participate in complex cognitive tasks,
- Increasing opportunities to receive sophisticated and individualized feedback,
- Building communities of interaction between teachers, students, parents, and other interested groups, and
- Expanding opportunities for teacher development (p. 512).

Supporters of technology-use within the classroom have discovered that the quality of learning is increased too with this instructional method (Gündoğdu, Silman, & Ozan, 2011, Kazu). Teachers are capable of providing students with engaging learning environments that allow them to work with small groups or individuals to remediate or enrich instruction for those students (Kazu).

Technology Use

Technology is an evolving tool that serves many purposes within the educational realm. The United States spent an estimated \$9.94 billion on educational technology in schools in 2014 (Murphy, 2014). Although this massive amount of money was spent on technology, teachers, even those that grew up using it, are not employing these practices with their students (Mundy, Kupczynski, & Kee, 2012). The ways to implement the use of technology can vary based on grade, type of school, availability of equipment,

curriculum guidelines, and administrative freedom to explore. With these varying factors, technology implementation fluctuates from classroom to classroom.

Successful Plans of Educational Technology. Recognized by the USDOE (2014), the Baltimore County Public Schools (BCPS) developed a multi-year comprehensive plan of technology integration. This plan consists of eight conversions that assist teachers in implementing technology.

Figure 3. USDOE (2014) Technology Initiative for Baltimore County

Developing a Multi-Year Approach: Baltimore County Public School District's (BCPS) Comprehensive Plan for Learning With Technology

To achieve its goal of ensuring that every school has an equitable, effective, digital learning environment and that all students and teachers have the personal technology they need to participate fully in connected learning, BCPS has developed and is implementing the Students and Teachers Accessing Tomorrow (S.T.A.T.) initiative.

S.T.A.T. is a multi-year plan for the transformation of BCPS that includes the following eight conversions:

1. **Curriculum.** BCPS teachers are creating a digitally enhanced curriculum that redefines how to deliver instruction in a learner-centered, blended learning environment while raising expectations and that places greater emphasis on critical thinking and analytical skills.
2. **Instruction.** All BCPS teachers will facilitate learning that includes the use of technology where appropriate. BCPS One, a fully integrated technology platform that brings together all of the district's programs and initiatives, offers a single interface for students and teachers to access blended curriculum content, including digital resources for teaching and learning.
3. **Assessment.** BCPS One will give teachers the ability to access and administer curriculum-aligned formative and summative assessments easily, as well as access a system-wide grade book, with real-time access for students and parents.
4. **Organizational Development.** Intensive job-embedded professional learning opportunities continue in the initiative's 10 pilot Lighthouse Schools, which serve as model demonstration sites with a Teacher Leader Corp turning their classrooms into learning labs.
5. **Infrastructure.** BCPS currently is updating its infrastructure to support S.T.A.T. by issuing mobile devices to instructional staff and students and by updating networks to ensure all schools are fully wireless. In addition, BCPS has partnered with the Baltimore County Public Library system to enable students to access the BCPS network in any county library.
6. **Policy.** Current BCPS policies are under review and revision to reflect a systematic shift in language that emphasizes empowering students and staff over mandating rules.
7. **Budget.** The significant changes necessary within BCPS to engage a growing and diverse student population and prepare students for college, career, and life will require substantial financial investment.
8. **Communication.** BCPS uses several communication outlets to provide information regarding S.T.A.T., including district and school websites, newsletters, social media, BCPS-TV, and Parent University.

In February 2015, the Johns Hopkins Center for Research and Reform in Education released a 2014 mid-year evaluation of the S.T.A.T. initiative's impact on the 10 pilot Lighthouse Schools.⁵ Although the report contains early baseline data, findings suggest that these schools are beginning to reflect the goals of S.T.A.T.

The Vancouver Public Schools in Washington are on a fast track of implementing technology for all students (USDOE, 2014). Their plan will equip every student, 23,000, with tablets for instructional uses at the cost of \$24 million. This plan also involves the community with city bus Wi-Fi access and hot spots at various locations throughout the city (USDOE, 2014). Their goal is to promote technological advancements outside the school and promote a digital natives for easy transition into school life.

Theoretical Frameworks

This literature review will examine the theoretical framework associated with Hall, Hord, and Roussin's Concerns-Based Adoption Model (CBAM) (2013), Collins, Brown, and Newman's Situated Cognition Theory (1989) and Viswanath Venkatesh's (1996; 1999; 2000; 2003; 2006) Unified Theory of Acceptance and Use of Technology (UTAUT), Technology Acceptance Model (TAM), Technology Acceptance Model 2 (TAM2), and Technology Acceptance Model 3 (TAM3).

Situated Cognition Theory and Cognitive Apprenticeship Model. Within the Situated Cognition Theory, the researcher expresses the focus on knowing is inseparable from actually doing and highlights the importance of learning with context (Brown, Collins, & Duguid, 1989). Although this theory was created decades ago, researchers conclude that it still plays a major role in the eLearning process through an approach that incorporates the practice of hands-on learning (Brown, Collins, & Duguid). Within a hands-on learning experience, the learner would be immersed into the context of the subject matter through the actual medium described in the activity which incorporates real-world experiences for the learner (Brown, Collins, & Duguid). This theory is coupled with the Cognitive Apprenticeship Model which was developed by Brown, Collins, and Newman in 1989.

The Cognitive Apprenticeship Model is the most effective way to implement a Situated Cognition strategy (Brown, Collins, & Duguid, 1989). Within a Cognitive Apprenticeship Model, the learner not only takes a theoretical approach to collecting the knowledge needed for understanding, but the learner participates in context-related

activities that are coupled with the theory of the skill presented in classroom presentation in an apprenticeship with an experienced expert (Brown, Collins, & Duguid).

In an apprenticeship, the learner would be exposed to the course material in a variety of ways. Modeling is one strategy in eLearning that allows the novice learner to gain insight from the expert during a demonstration of the concept (Brown, Collins, & Duguid, 1989). Another key strategy in the Cognitive Apprenticeship Model would be the coaching of content material as delivered by the novice learner. The delivery is critiqued by the expert, in order to derive at crucial feedback that enables the learner to make necessary adjustments (Brown, Collins, & Duguid). Scaffolding is another key strategy implemented to enhance the learner's experience while using a variety of techniques that are observed and evaluated by the expert for understanding. Articulation serves as a key strategy for eLearning content. Students are encouraged to articulate their learning process using eLearning concepts while expanding upon the problem-solving process and inquiry learning practices (Brown, Collins, & Duguid). The reflection strategy of this concept allows the learner to compare their problem-solving and critical thinking techniques to those of their peers and the expert delivering the content (Brown, Collins, & Duguid). Finally, exploration serves as the final strategy in the Cognitive Apprenticeship Model. Exploration allows the learners to explore challenging online tasks that require them to rely on their pedagogical knowledge to serve as their online help (Brown, Collins, & Duguid).

While many instructional designs provide the learner with multiple approaches to implement and a plethora of knowledge to incorporate, a Situated Learning and Cognitive Apprenticeship Model supplies the learner with real world activities that require on the

spot application of knowledge (Brown, Collins, & Duguid, 1989). These learning theories have been overlooked by the education community (Brown, Collins, & Duguid).

Although most have overlooked this approach, some have found it beneficial in certain cases.

University professors at Michigan State University implemented these theories with pre-service teachers with no teaching experience and limited background knowledge in learning technology (Shaltry, Henriksen, We, & Dickson, 2013). Researchers found these activities beneficial and need to be incorporated into the real classroom with students for full evaluation of strategies (Shaltry, Henriksen, We, & Dickson). Situated Cognition Theory allows the learner to focus on community life and social practice on one's cognitive ability performing any given educational technology design (Ouyang & Stanley, 2014). A conceptual framework for Science, Technology, Engineering, and Mathematics (STEM) curriculum integration for pre-service teachers at Purdue University and the University of Georgia was created to incorporate STEM into classrooms with technology education using the Situated Learning Theory (Asunda & Mativo, 2016).

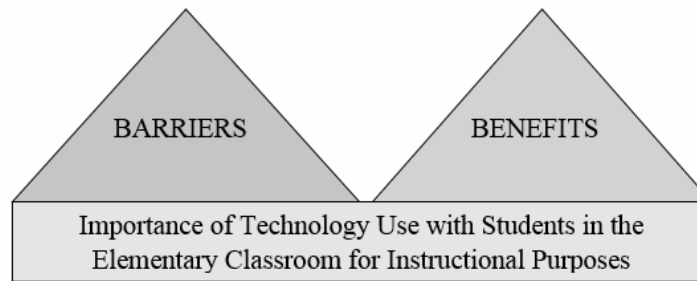
UTAUT. The Unified Theory of Acceptance and Use of Technology (UTAUT) was constructed by Venkatesh et al (2003) but was established based on the Social Cognition Theory and eight, informational technology models. These models include: The Theory of Reasoned Action (TRA), The Theory of Planned Behavior (TPB), The Technology Acceptance Model (TAM), The Motivational Model (MM), A Model Combining the Technology Acceptance Model and The Theory of Planned Behavior (C-TAM-TPB), The Model of PC Utilization (MPCU), The Innovation Diffusion Theory

(ID) and Socio Cognitive Theory (SCT) (Taiwo & Downe, 2013). In analyzing these technology models, the researchers concluded that there are four determinants for this theory: performance expectancy, facilitating condition, social influence, and effort expectancy (Venkatesh). While these determinants are used in multiple combinations, there are four moderators that are expressed in all applications of the theory. These moderators include age, gender, experience, and voluntariness of use (Venkatesh).

TAM, TAM2, & TAM3. According to Park (2009) the Technology Acceptance Model (TAM) is one of the most well-known technology acceptance model available to determine the use of information technology by capable learners. TAM provides a basis with which one traces how external variables influence belief, attitude, and intention to use (Park, 2009). According to TAM, “one’s actual use of a technology system is influenced directly or indirectly by the user’s behavioral intentions, attitude, perceived usefulness of the system, and perceived ease of the system” (Park, p. 151). TAM also suggests that external factors affect purpose and actual use through facilitated effects on perceived usefulness and perceived ease of use (Park). As TAM has evolved over the years, TAM2 and TAM3 have been developed to further the usefulness of technology. “TAM2 extended the original model to explain perceived usefulness and usage intentions including social influence (subjective norm, voluntariness, and image), cognitive instrumental processes (job relevance, output quality, and result demonstrability) and experience” (Park, p. 152). TAM3 was created with the remnants of TAM2 and the newly defined ease of using the technology based on the most current research and findings. The TAM3 model contains both factors influencing “perceived ease of use (computer self-efficacy, computer anxiety, computer playfulness, perceptions of external

control, perceived pleasure and objective usability) and perceived usefulness (perceived ease of use, subjective norm, image, and result demonstrability)” (Venkatesh & Bala, 2008, p. 14).

Figure 4. Research Framework for this Study



Summary

From the beginning of time, technology has played some role in day-to-day functions and activities. With each year and with the production of each new device, the product has become more advanced, sleeker, and faster performing for the consumer, but there must be someone who can operate these new devices. If the corporate world, educational institutions, and household denominations rely on the usability and dependability of technology on a daily basis, the student population must graduate with 21st century skills that allow them to compete and survive the global market.

With technology comes advantages and disadvantages that promote or hinder the production of quality instruction within the educational setting. Researchers know that technology integration provides students with a wide array of benefits, but there are those that find the barriers that apprehend the use of technology in the classroom. Whether one stands in support or opposition for technology integration, educational settings must

provide students with the opportunity to utilize these tools to magnify their learning experiences.

In order for educators to provide this opportunity to their students, the district, state, and federal government must acknowledge the importance of technology integration as a collective body. The benefits for technology integration far outweigh the negative effects, but a teacher's perception and how they view the item is key to the success of implementation. If the perception is positive, then these educators should be exposed for their successes in uncovering a more creative way of learning for students.

Table 1. Concept Analysis Chart

TOPIC: Studies Related to Benefits and Limitations of Using Technology within the Elementary Classroom

STUDY	PURPOSE	PARTICIPANTS	DESIGN/ ANALYSIS	OUTCOMES
Yesilyurt, Ulas, & Akan (2016)	The purpose of this study sought for a correlation among the effects of teacher self-efficacy, academic self-efficacy, computer self-efficacy, and attitude toward applying computer-supported education and which additionally explains the relationship to one another.	323 prospective teachers in their first through fourth year of schooling at a private university in Anatolian part of Turkey	The research design is a relational descriptive model.	<ul style="list-style-type: none"> ● Teacher self-efficacy positively and significantly affects academic self-efficacy, computer self-efficacy, and attitude toward applying computer-supported education. ● Teacher self-efficacy, academic self-efficacy, and computer self-efficacy are important predictors and latent variables of the attitude toward applying computer-supported education, which is one of the most important outcomes of the research.

Table 1. Continued

Domingo & Gargante (2016)	The purpose of this study collected data about teachers' individual information, teachers' perceptions on the impact of mobile technology in learning, and use of a set of selected apps. in the classroom.	102 teachers in 12 different primary schools in Spain	The researcher used a questionnaire with Likert-type responses. The IBM SPSS Statistics analyzed the data once collected by researcher.	<ul style="list-style-type: none"> ● The highest learning impacts of mobile technology are facilitating access to information, providing new ways to learn and increasing engagement in learning. ● The type of apps. most used is Content Learning Apps. ● Only users of a limited number of apps. perceived significantly higher most of the learning impacts of mobile technology.
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Brenner & Brill (2016)	<p>The purpose of this study sought to identify instructional technology integration strategies and practices in pre-service teacher education that contribute to the transfer of technology integration knowledge and skills to the instructional practices of early career teachers.</p>	<p>24 male and female early career teachers participated in the survey and 6 of the 24 followed up with an interview</p>	<p>The study employed a two-phase, sequential explanatory strategy, utilizing mixed methods approach.</p> <p>The study was conducted in the School of Education at a large, United States research university.</p>	<ul style="list-style-type: none"> ● This study provides teacher educators and scholars with empirical findings related to technology integration strategies in teacher education that both support and hinder the transfer of new knowledge and skills to the classroom practices of early career teachers. ● This research provides teacher educators with naturalistic recommendations on how to improve their programs that corroborated by the literature. ● The study offers an adapted survey that can utilized by researchers to investigate technology integration transfer from the teacher education period to the early classroom practice period of new teachers.
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Carver (2016)	This study explores K-12 teachers' perceptions of the benefits and barriers to technology integration by either teachers or students in K-12 instruction.	68 students enrolled in online classes in the graduate studies in education department of a small private liberal arts institution in the southeast	Anonymous, online survey with qualitative and quantitative questions	<ul style="list-style-type: none"> ● The data analyzed resulted in first order barriers, such as technology availability, are still major concerns that impact both student and teacher use. ● Equipment availability seemed to have the greatest impact on whether technology was incorporated into classroom instruction. ● Teacher knowledge and skill was not the teachers' first consideration. ● The major reason teachers chose to use technology was because they felt it resulted in increased student engagement. ● Bandwidth was not a concern for teachers, but it was for the students.
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Hsu (2016)	The purpose of this study was to examine the current beliefs, practices, and barriers concerning technology integration.	152 teachers in K-6 th grade classrooms in the Midwestern United States	<p>Mixed methods research design was used with this study.</p> <p>The researcher used surveys, interviews, and observations to collect the data.</p>	<ul style="list-style-type: none"> ● The results proved that a majority of the teachers held constructivist pedagogical beliefs about technology integrations. ● It also found that the teachers who held constructivist beliefs about technology use had high self-efficacy beliefs about technology use, place positive value on the use of technology, and had two or more practices of high-level learning in their lessons. ● Language arts was the subject that gained the most attention for technology integration. ● Four barriers were students' lack of computer skills, teachers' lack of training in technology, teachers' lack of time to implement technology-integrated lessons, and teachers' lack of technical support.
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Table 1. Continued

CHAPTER III

METHODOLOGY

Introduction

Within this study, the researcher seeks to evaluate an elementary school in Georgia and the potential barriers and benefits of technology usage within a teacher's individual classroom. The instrument used to collect the data will inspect individual educators at ABC Elementary School will be a Likert-type survey. The survey will allow the participants to assign a value to research-based benefits and barriers identified with technology usage in the classroom. The descriptors examined in depth will be the teachers' perceived benefits and barriers to technology use and possible relationship between the frequency of technology use and the barriers and benefits. The descriptors mentioned above will attempt to answer the following research questions: What are the barriers perceived by teachers in using technology within their individual classroom? What are the benefits perceived by teachers in using technology within their individual classroom? To what extent do teachers perceive a relationship between technology barriers and benefits within their individual classroom?

While many studies from various areas within the world have been conducted that examine some of the same descriptors, none have been executed with the targeted population of educators in this study. In 2011, Holden and Rada researched the reception and usage of technology. Kazu (2011) investigated factors that affect the usage of educational technology. Researchers assessed the predictors of teacher usage of technology in the classroom (Miranda & Russell, 2012). Gündoğdu, Silman, and Ozan

(2011) investigated teacher perception of technology usage. Finally, Kurt and Cirtci (2012) explored the issues that obstruct and contribute to a teachers' technology use in the elementary setting. In 2016, many researchers (Coleman, Gibson, Cotton, Howell-Moroney, & Stringer; Hsu; Brenner & Brill; Carver; Domingo & Gargante; & Yesilyurt, Ulas, & Akan) evaluated the balance of barriers and benefits of using technology within the classroom. In evaluating the purpose of all of these studies, none of these focus on the combination of factors described in this study for the population of interest.

In this chapter, the researcher seeks to state the purpose of this study by identifying the elected research questions under review. Then, the data collected will attempt to answer or reveal the components necessary to satisfy the research questions. In order to collect the data, the researcher must have a research design that matches the desired type of instrument used to collect the data for this study. Once the research design and instrument used to gather data for this study have been determined and created by the researcher, the identification of the appropriate population and sampling methods targeted for this study will be defined. Then, the researcher will devise a system of procedures to execute the delivery and collection of data needed to answer the research questions.

Research Questions

Within this study, the research design will attempt to answer the following research questions.

Research Question 1: What are the barriers perceived by teachers in using technology within their individual classroom?

Research Question 2: What are the benefits perceived by teachers in using technology within their individual classroom?

Research Question 3: To what extent do teachers perceive a relationship between technology barriers and benefits within their individual classroom?

Research Design

After reviewing various research designs and approaches, the research design implemented for this study will be a mixed methods methodology. According to Venkatesh, Brown, and Sullivan (2014),

researchers have identified three advantages of mixed-methods research: 1) it enables researchers to simultaneously address confirmatory and explanatory research questions and, therefore, evaluate and generate theory at the same time; 2) it enables researchers to provide stronger inferences than a single method or worldview; and 3) it provides an opportunity for researchers to produce a greater assortment of divergent and/or complementary views (p. 437).

With the integration of a quantitative and qualitative approach to research, it is obvious that the two methods will bring about a study that is more affluent in gaining an understanding of the research questions posed within this study (Creswell & Garrett, 2008). Thus, leading the researcher to a mixed methods, descriptive study design that will begin with a quantitative survey for data collection purposes. After the quantitative data is analyzed, it will be followed by a qualitative design of a single, focus group. This combination of methods, survey and focus group, for a case study, will allow for the data to form converging evidence (Creswell, 2003 & Yin, 2009). The case study will be

minimal in the amount of participants, due to the size of the sample and population of participants.

The researcher will conduct a mixed methods, descriptive study design with four-point Likert survey that will supply numerical data that will be represented in levels and ratings from the survey. These questions are a set of items that evoke a response from a population of participants (Blackstone, 2012). This method is the most commonly used technique for collecting data (Neuman, 2004). It also is suitable in self-reporting about particular behaviors, beliefs, attitudes, opinions, characteristics, expectations, self-classification, and knowledge (Hagan; Neuman, 2004). The purpose of the survey for this study was to generate quantitative data about the perceived benefits and barriers of teacher usage of technology that could be analyzed later in the research (Fowler, 2002).

This study will conduct a four-point, Likert survey to gain insight of the teachers' perceived ideas of technology benefits and barriers that evolve in using technology for instructional purposes within their individual classroom. The four-point, Likert survey was selected based on simulation and empirical studies conducted that yield the strongest reliability and validity using this method of instrument design and collection of data (Chang, 1994; Pemberton, 1933). The survey will be administered during the second semester of the 2016-2017 school year. This type of survey will allow the researcher to gain information during a snapshot of time within this school year (Blackstone, 2012). The survey will be self-administered through the recipient's email address available to the researcher, as part of the ABC Elementary School faculty.

The mixed methods approach for this study will consist of a single case study design. This step will be the qualitative component within this research design. After the

quantitative data has been analyzed by the researcher, the focus group will attempt to explain and build upon the findings from the quantitative results. Yin (2006b) agrees, “the focus on a single study is critical to mixed methods research; a single study is the valuing of mixed methods in producing converging evidence, presumably more compelling than might have been produced by any single method alone” (p. 41). Therefore, the use of a single-case study will provide the researcher with detailed information that allows for the acceptance or rejection of theories and establish explanations that might satisfy the relevance of the results, and limits the control of the researcher by examining the how and why (Yin, 2006b, 2009).

Population and Sample

During this study the target population will consist of 24 kindergarten through fifth grade teachers, 4 within each grade-level, located in an elementary setting within a technology magnet school in the State of Georgia, ABC Elementary School. The content taught in these classrooms vary from departmentalized or self-contained focusing on math, science, social studies, reading, writing, and/or grammar. This population of teachers will vary in age of experience from novice to experts in technology integration, age of teaching experience, and various levels of maturity. The target population determined will be represented in the accessible population.

This accessible population for this study will consist of a public school within the Muscogee County School District that educate students in grades kindergarten through fifth grade. In working in the Muscogee County School District, access to teacher emails is available to the researcher. With this defined population of participants, the researcher will administer a convenience sampling. In a convenience sampling, the nonprobability

or nonrandom sampling begin with members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of the study (Ilker, Sulaiman, & Rukayya, 2016).

After the selection of the public school within a Georgia county was identified, the principal was contacted in order to verify the need for this research study. The principal indicated that the faculty has a wide range of users of technology that vary from novice to expert and is in need of an evaluation that indicates their perception and attitudes toward technology integration. The selected elementary school is also in the process of adopting iPads for teachers to use within their classrooms. The principal specified that with the amount of money invested in this adoption, there needs to be a plan of action to address the various levels of technology integration experience to maximize the use of the devices.

The 24 educators within this elementary school were invited to participate in this research study via email. In the email, the research study and data collection process were described to the participants. The email invitation also included the purpose of the study, the techniques used to implement the design study from beginning to end, information about the researcher, confidentiality, time frame of the study, the benefits and risks associated with the study, and the plan of action in the end.

Instrumentation & Data Collection

Instrumentation of a Likert-type survey will take place during the second semester of the 2016-2017 school year. The distribution of the survey will be administered when permission has been granted by the selected school district and IRB. Once permission is

granted by the county to proceed with the research via email, the researcher will construct an email group with all 24 elementary teachers. All elementary teachers will include the four grade-level representatives in kindergarten through fifth grade teachers at the technology magnet school.

The teachers participating in the survey will receive an email with a link that will reroute them to a survey website. The site used for constructing, distributing, and collecting the data will be Survey Monkey (2016) see Appendix B. The researcher will transfer the survey in Appendix B into the survey platform question-by-question. Then, the program will prompt participants through the survey questions and record their answers for the researcher.

The survey questions were designed to evaluate the variables in technology integration within the elementary classroom. In collecting this information for the study, the researcher will gain insight into the interpreting the results at the end of the process. The elements that are being examined by the researcher are the perceived benefits and barriers of technology use within their classroom. The survey questions are constructed using a Likert-type response with categories, strongly agree, somewhat agree, strongly disagree, and somewhat disagree. The teachers will complete the surveys via emailed link on Survey Monkey.

The results from the survey will be divided into two different headings of barriers and benefits. The mean for each barrier and benefit will be calculated to expose the ranking order of the descriptors identified by the 24 teachers used in the study from ABC Elementary School. The ranking order of each barrier and benefit in technology use within the elementary classroom will become instrumental in the development of focus

group questions. These questions will be administered to the focus group of 10-15 teachers to confirm the survey results in this mixed method design.

Once the data is analyzed and the ranking order of the benefits and barriers are identified, the researcher will use it to identify 10-15 teachers to participate in a focus group. The focus group will meet in a designated location within the school, and the interaction will be recorded to analyze and code the results. The participants will be assigned a number for confidentiality purposes. All surveys and recordings for this project will be password-protected and accessible only by the researcher. All data and recordings will be destroyed after reported for research purposes.

The outlined determinants will be taken into consideration when the results are reported at the end of the research. The results will be based on the participants' responses to the questions on the survey that dissect the following variables of interest in this study. The researcher wants to gain insight on the following variables, teacher's perceived idea of the benefits and barriers of technology use within the elementary classroom and possible relationship between the benefits and barriers in reference to the usage of the technology in the classroom. The researcher is looking to find any relationship among the outlined items. The researcher wants to know how all of these variables, independent or dependent of one another affect their teaching and implementation of technology within their classroom.

Data Analysis

Descriptive analysis will be executed by the researcher to depict the results gained by the survey administered to participants. This form of analysis sets out to describe and interpret what is

conditions or relationships that exist; practices that prevail; beliefs, points of view, or attitudes that are held; processes that are going on; effects that are being felt; or trends that are developing. Descriptive research is concerned with how what is or what exists is related to some preceding event that has influenced or affected a present condition or event (Cohen, Manion, & Morrison; 2007; Best, 1970, p. 205).

The descriptive data will be presented in the form of a mean for each question displayed in the survey. This data collected from each question in the survey will define variables that allow the researcher to draw conclusions for this study.

Summary

In this chapter, the researcher establishes the medium for collecting the data needed in order to satisfy the research questions: What are the barriers perceived by teachers in using technology within their individual classroom? What are the benefits perceived by teachers in using technology within their individual classroom? To what extent do teachers perceive a relationship between technology barriers and benefits within their individual classroom? The research design allows for the researcher to administer a survey that evaluates the intent of the conceptual framework. The conceptual framework for this study is addressed within each section of the survey.

The survey will be administered to the elementary population of teachers within the Muscogee County School District, in order to collect data that is relevant to the state of Georgia. This survey will be administered through a computerized form to allow for easy completion by participants and instant collection of data for the researcher. The

analyzation of data will create variables that describe current practices within the classrooms.

CHAPTER IV

REPORT OF DATA AND DATA ANALYSIS

Introduction

Within this study, the researcher proposed to determine elementary teacher perceptions of technology use within their individual classrooms. These perceptions of technology use were evaluated on research-based barriers and benefits that may or may not have a relationship between the perceptions and the barriers and benefits (Coleman, Gibson, Cotton, Howell-Moroney, & Stringer; Hsu; Brenner & Brill; Carver; Domingo & Gargante; & Yesilyurt, Ulas, & Akan). This elementary school is located within a public school district in the State of Georgia. The population of participants consisted of 24 teachers in grades kindergarten through fifth grade. The researcher conducted a four-point Likert scale survey to determine the teachers' perceptions about the barriers and benefits of technology use within their individual classrooms. Once the survey results were collected by the researcher, a set of open-ended, focus group questions were created to discuss with the same participants at a later date. The use of the survey and focus group were searching for a relationship between the teachers' perceptions in accordance with the benefits and barriers of technology use within the individual classroom.

Research Questions

The first research question sought to expose the perceived barriers of using technology within a teacher's individual classroom.

Research Question 1: What are the barriers perceived by teachers in using technology within their individual classroom?

Research Question 2: What are the benefits perceived by teachers in using technology within their individual classroom?

Research Question 3: To what extent do teachers perceive a relationship between technology barriers and benefits within their individual classroom?

Participants

The demographic nature of the population of respondents was diverse in all areas, except for gender and race/ethnicity. ABC Elementary School is comprised of 100% female, classroom teachers that consider themselves white, non-Hispanic individuals. The population of teachers at ABC Elementary School is a mature faculty with the majority of participants aging 35 and older. The years of teaching experience ranged from 11+ years for the majority of respondents with a plethora of graduate level degrees (see table 2).

Table 2. Demographic Information for Participants

		N	%
Gender	Female	24	100%
	Male	0%	0%
Age	18-25	0	0%
	26-35	3	12.5%
	35-45	9	37.5%
	45+	12	50%
Years of Teaching Experience	0-3	0	0%
	4-10	3	12.5%
	11-20	14	58.3%
	20+	7	29.2%
Degrees	Bachelor	7	29.2%
	Masters	14	58.3%

	Specialist	2	8.3%
	Doctorate	1 (ABD)	4.2%

Table 2. Continued

Race and Ethnicity	Non-Hispanic white	24	100%
	Hispanic or Latino	0	0%
	African American	0	0%
	Other	0	0%

Findings

Within this study, the researcher sought to analyze the perceptions of teachers within ABC Elementary School on the use of technology within their individual classroom. This study also evaluated the benefits and barriers that effect those perceptions. The purpose of this study was to determine what benefits and barriers play a role in the use of technology use within classrooms in ABC Elementary School, along with the how these barriers and benefits affect technology use.

To investigate the teacher's perceptions of the benefits and barriers of technology use within the individual classroom, the research participants were administered a four-point Likert survey with benefits and barriers to technology use that were rated from 1 to 4, with 4 representing strongly agree with the content mentioned in the survey. In order to collect data to answer the research questions, the researcher created the electronic survey with research-based barriers and benefits that allowed the participants to rank their perception of technology use within their classroom based on the enhancement or hindrance of parameters. After the survey was created and disbursed to all 24

participants, the researcher collected and analyzed the results to conduct a focus group with questions based on the survey responses.

The collection of benefits and barriers used within the survey were adopted from multiple research articles conducted within the last two to three years (Coleman, Gibson, Cotton, Howell-Moroney, & Stringer; Hsu; Brenner & Brill; Carver; Domingo & Gargante; & Yesilyurt, Ulas, & Akan). The benefits and barriers were identified by researchers within the education profession. The benefits and barriers used within this study are not the only identifiers of technology use within the classroom. The benefit and barrier components for this study were selected based on the number of times researchers referred to them within their studies (Coleman, Gibson, Cotton, Howell-Moroney, & Stringer; Hsu; Brenner & Brill; Carver; Domingo & Gargante; & Yesilyurt, Ulas, & Akan).

In collecting this data for the project, there were many similarities between the survey and focus group responses, along with the validation of results in reviewing previous research from other scholars in the field (Coleman, Gibson, Cotton, Howell-Moroney, & Stringer; Hsu; Brenner & Brill; Carver; Domingo & Gargante; & Yesilyurt, Ulas, & Akan). While the results from the survey highlighted the benefits as far more prevalent in their effectiveness in using technology within the classroom, the barriers were supported during the focus group. The only benefit that caused some concern would be the outlying support for the ability to allow students the opportunity to work on their research skills. Although this benefit was ranked highest on the survey, the focus group revealed that they cannot accomplish much on the technology because the students do not know how to operate the equipment and frustration ensues for the teachers. The

remaining barriers and benefits from the survey were discussed throughout the focus group session.

Survey of Participants

The survey revealed that the participants somewhat agree that the benefits and barriers both play a role in a teacher's perception of the use of technology within their individual classroom. While the participants agree that both, benefits and barriers, played a role, the contributing participants identified that the benefits played a more significant part in enhancing the use of technology within the individual classroom. The average weighted score for all of the benefits was a $\bar{x}=3.32$, which indicated a somewhat agree category. All of the barriers have a weighted score of $\bar{x}= 2.67$, which indicated that the participants somewhat disagree with the listed barriers causing a problem with the use of technology in their individual classrooms.

The surveyed results for the barriers of technology use were collected and are listed below in table 3. The participants were given the opportunity to assign a score of 1 (strongly disagree), 2 (somewhat disagree), 3 (somewhat agree), or 4 (strongly agree), via the four-point Likert survey, to each barrier based on how they were affected by them within their classroom when implementing the use of technology.

Table 3. Survey Results for Barriers

BARRIERS						
To what extent do the following barriers affect the use of technology within YOUR classroom?						
Answer Options	strongly disagree (1)	somewhat disagree (2)	somewhat agree (3)	strongly agree (4)	Rating Average	Response Count
Availability of existing technology	3	3	11	7	2.92	24

Amount of technology	2	5	11	6	2.88	24
Location of technology	4	8	8	4	2.50	24

Table 3. Continued

Lack of time to devote to the creation and implementation of technology integrated lessons	0	2	7	15	3.54	24
Teacher knowledge and skill	4	6	8	6	2.67	24
Lack of professional development	4	9	6	5	2.50	24
Connectivity issues	1	8	5	10	3.00	24
Lack of administrative support	10	6	7	1	1.96	24
					<i>answered question</i>	24
					<i>skipped question</i>	0

The barrier results were ranked, by the researcher, below based on their average, weighted score. The 2 score calculated from the four-point Likert scale responses was calculated for each barrier and ranked below for easy identification of the most and least influential barriers. The barrier that effected the use of technology within the classroom for the 24 participants was the lack of time to devote to the creation and implementation

of technology integrated lessons with $\bar{x}=3.54$. The lack of administrative support scored the lowest with a $\bar{x}=1.96$. The other rankings based on \bar{x} scores are listed in table 4.

Table 4. Mean Scores for Barriers

BARRIER	\bar{x} of the Participants' Responses
Lack of time to devote to the creation and implementation of technology integrated lessons	3.54
Connectivity issues	3.00
Availability of existing technology	2.92
Amount of technology	2.88
Technical support	2.71
Teacher knowledge and skill	2.67
Evolution of the equipment	2.50
Lack of professional development	2.50
Location of technology	2.50
Students' lack of technology skills	2.46
Lack of software available	2.42
Lack of administrative support	1.96

The surveyed results for the benefits of technology use were collected and are listed below in table 5. The participants were given the opportunity to assign a score of 1 (strongly disagree), 2 (somewhat disagree), 3 (somewhat agree), or 4 (strongly agree), via the four-point Likert survey, to each barrier based on how they were affected by them within their classroom when implementing the use of technology.

Table 5. Survey Results for Benefits

BENEFITS						
To what extent do the following benefits enhance the use of technology within YOUR classroom?						
Answer Options	strongly disagree	somewhat disagree	somewhat agree	strongly agree	Rating Average	Response Count
Increased student engagement	0	1	9	14	3.54	24

Increased student achievement	0	3	16	5	3.08	24
Method of differentiation	0	0	9	15	3.63	24
Opportunity to work on researching skills	0	0	5	19	3.79	24

Table 5. Continued

Provides more current content information	0	0	11	13	3.54	24
Creates a more flexible learning environment	0	0	9	15	3.63	24
Promotes collaborative learning	0	0	11	13	3.54	24
Saves time and effort	2	7	12	3	2.67	24
Helps me organize my work	1	6	10	7	2.96	24
Promoted teacher-student-parent communication	0	1	11	12	3.46	24
Promotes creativity and self-expression	0	3	8	13	3.42	24
Improves retention rate	3	7	11	3	2.58	24
<i>answered question</i>						24
<i>skipped question</i>						0

The benefit results were ranked, by the researcher, below based on their average, weighted score. The \bar{x} score calculated from the four-point Likert scale responses was calculated for each benefit and ranked below for easy identification of the most and least influential benefit. The benefit that effected the use of technology within the classroom for the 24 participants was the opportunity to work on research skills with \bar{x} =3.79. The

benefit of improves the retention rate scored the lowest with a \bar{x} =2.58. The other rankings based on \bar{x} scores are listed in table 6.

Table 6. Mean Scores for Benefits

BENEFITS	\bar{x} of the Participants' Responses
Opportunity to work on research skills	3.79

Table 6. Continued

Creates a more flexible learning environment	3.63
Method of differentiation	3.63
Promotes collaborative learning	3.54
Provides more current content information	3.54
Increased student engagement	3.54
Promotes teacher-student-parent communication	3.46
Promotes creativity and self-expression	3.42
Increase student achievement	3.08
Helps me organize my work	2.96
Saves time and effort	2.67
Improves retention rate	2.58

Focus Group with Participants

The researcher hosted a focus group that consisted of 21 out of 24 surveyed participants. The following questions were asked to all participants in the group, and the

responses recorded below in table 7 were collected in a video recording of the focus group session.

Table 7. Focus Group Discussion Responses

How does time prevent the creation and implementation of technology integrated lessons?
<p>Responses to this question include...</p> <ul style="list-style-type: none"> ● The training takes place during the school year, so you don't have time to create any of the lessons because of all of the other distractions with students. ● Other responsibilities other than school and work to create any lessons ● Laptop connectivity and functionality eat away your time for implementing these lessons.
Does the location of technology play a role in the utilization?
<p>Responses to this question include...</p> <ul style="list-style-type: none"> ● If the equipment has to be checked out or collected for classroom use, you are not going to use it. ● Classroom location of material makes it more feasible in implementing the lesson. ● Spontaneity of spin off lessons that could be used during a particular time frame cause problems, if the equipment must be located. ● Availability of mobile carts plays a role in using the technology because checking them out for class sets is nearly impossible with 24 classroom teachers. ● Classroom set-up with the number of students in a class make it difficult to utilize the technology in an appropriate way.
How does the use of technology play a role in student achievement and student engagement?
<p>Responses to this question include...</p> <ul style="list-style-type: none"> ● Increases engagement for sure because the students are excited to use it. ● Depending on the skills taught in class, we would search for games and apps that would give them that active practice with the skills needed in class. The kids didn't realize that they were actually reinforcing skills. ● It gave the kids a different form of instruction instead of the manipulatives and worksheet. ● The level of competition is raised with the need to achieve higher than their neighbor for some games online. ● Some of the programs and software hold the child's attention better than the teacher in some cases which helps with engagement.

What role does the administrator play in using technology within your individual classroom?

Responses to this question include...

- The administrator must provide the resources.
- They must support the role within individual classrooms and how that teacher feels about the use of it.
- The administrator must know how to use it too.
- They must provide professional development that is relevant to the teachers.
- The administrator must hold teachers accountable with appropriate use of technology.

How does the use of technology create a more flexible learning environment?

Responses to this question include...

- It allows the teacher more flexibility to work with other small groups.
- The use of some web-based programs allow the students to work at home and school.
- It provides more opportunity for the students to create their own learning experience and accountability.
- It provides all learning styles the opportunity to experience learning in their own way.
- differentiation

How does the use of technology play a role in the retention rate of student understanding?

Table 7. Continued

<p>Responses to this question include...</p> <ul style="list-style-type: none"> ● It provides for more reinforcement and spiraling of information taught in class while using a variety of sites to review. ● Technology is hurting the retention of information because they use it so often in structured and non-structured ways. ● It not only needs to be used for remediation of academic material, but for the use of future job compliance...computer programming, coding, etc... ● The drill and kill practice seems to hinder their retention of material, but the application of material would be a better use of retention. If the child can apply the concept with a technology-based project, then the retention would be more evident. ● The teacher has an abundant amount of content that technology cannot teach, so the retention is effected because we, the teacher, do not have all of the bells and whistles associated with computer apps. and software. Teachers compete with technology all the time in school and at leisure. ● Technology cannot act as a babysitter for teachers to getting something done. We can't kid ourselves in thinking that we are technology rich because we have our students using various apps. all the time. ● Textbooks online plays a negative role in the retention of information because not all students have iPads or devices to access this information. ● GMAS testing causes students to limit their information because of the number of characters allowed in constructed-response questions. Assessments on technology cause students to forget their test-taking strategies taught for paper-pencil assessments.
<p>How could the lack of software available to students and teachers affect instruction?</p>
<p>Responses to this question include...</p> <ul style="list-style-type: none"> ● Center and remediation is affected when software and programs are not available for students. ● Teachers have a plethora of resources and ways to teach, and they adapt to any given circumstance. ● The consistency school-wide needs to be prevalent, so teachers do not go out and search for their own software to use. It needs to be consistent for all, so the appropriateness is not lacking in the delivery of concepts. ● Balance of all things, both teacher-centered, student-centered, and technology-centered. ● Student needs are important too. Some students get frustrated with the use of technology and some cannot live without it.
<p>How does the use of technology save time and effort within the classroom?</p>

Responses to this question include...

- The creation of content and resources are helpful for years to come when teaching that same academic content.
- Wi-Fi and connectivity issues cause for frustration and do not save on time.
- BYOD does not let you function the way you had planned when parents do not let their children bring their devices to school or do not have them to bring to school for use in the classroom.

Table 7. Continued

- Engrade graded assessments online and allowed for you to remediate immediately.
- SMART Exchange is a great resource to use for teacher-created materials on standards taught in the classroom or tweak what someone else has created for your purposes.
- The amount of resources available is overwhelming a lot of times, and teachers do not know where to begin looking for materials to use in the classroom.

What organizational tools do you use with technology that assist you in the classroom?

Responses to this question include...

- Engrade
- SMART Exchange
- Brain Pop
- Flocabulary
- Plickers
- Kahoot
- Some of these are used for review and organize your data for remediation.
- When students are absent, many apps and software are used to help fill in the information covered in class until the teacher can get to that student for more in-depth review.

Why would professional development cause a teacher not to use technology within their classroom?

Responses to this question include...

- They are overwhelmed, scared of it, or time to use the device or program. Many times the teachers are presented with information on how to use it but are not given the opportunity to apply the information learned at the training. The time to practice skills learned during professional development are not representative of how we are taught to teach our students.
- Hands-on and interactive not available.
- Professional development should teach a skill and require teachers to go create a lesson with that particular device or program to gain experience and mastery of the skill.
- Observation of other teachers using the skill would be beneficial of those that do not feel as comfortable using certain devices or programs.
- Culture among the young/old and expert/novice users to want to help each other.
- There needs to be more professional development provided by districts and schools to assist in the implementation and introduction of apps that are available in education.
- In-house IDEA fair once a month for specific teachers; skills need list; model lessons with technology
- Faculty meeting snip it's and presenting technology skills or programs that available for everyone, so they can use it immediately within their classrooms.
- Refresher courses over a period of time.
- Technology mentors for the year

How does the teacher's knowledge and skill correlate with professional development of technology use within the classroom?

Responses to this question include...

- see above

What skills do student's lack in using technology within the classroom?

Responses to this question include...

- Younger students need to master keyboarding skills.
- Saving on a flash drive
- Computer literacy of skills and computer hardware
- Technology skills and standards must be mastered per grade level based on the requirements.

Data Analysis

The research data were represented in the form of tables and text. The tabular data was collected using an electronic survey, Survey Monkey (2016), and the data presented in text was collected using a single, focus group. The data was collected from 24 multiple

sources within ABC Elementary School to ensure credibility of the data. All 24 classroom teachers within the school participated in the tabular form of data reported and 21 of the 24 teachers participated in the data presented in textual form. The data from each instrument was calculated and correlated by comparing the tabular results to the text data collected through a focus group. The focus group questions were formulated based on the outcome of the survey results.

Research Question 1: What are the barriers perceived by teachers in using technology within their individual classroom?

The barriers used within this study were collected based on their popularity in other research studies conducted by fellow educators in the field (Coleman, Gibson, Cotton, Howell-Moroney, & Stringer; Hsu; Brenner & Brill; Carver; Domingo & Gargante; & Yesilyurt, Ulas, & Akan). The barriers evaluated within this study were the availability of existing technology, amount of technology, location of technology, lack of time to devote to the creation and implementation of technology integrated lessons, technical support, teacher knowledge and skill, students' lack of technology skills, lack of professional development, lack of software available, connectivity issues, evolution of the equipment, and administrative support. The barriers identified in table three, by the researcher, were collected by analyzing research materials that dealt with the same topic of interest. While all barriers exhibited some type of controversy, the barriers were ranked by the participants in the following order.

The researcher discovered that lack of time to devote to the creation and implementation of technology integrated lessons hindered the use of technology within several classrooms at ABC Elementary School with a weighted average of 3.54 out of

4.00. This 3.54 weighted average indicated that the participating teachers somewhat agree with the barrier indicated in using technology within their classroom. Connectivity issues with gaining access to the Wi-Fi capabilities within the building, with a weighted average of 3.00, and the availability of existing technology for check-out by classroom teachers, had a weighted average of 2.92, played a major role in technology use, which indicated a somewhat agree response to these barriers. The barriers mentioned next created a response that indicates the participants somewhat disagree with these causing any affliction in using technology within their classroom. The amount of technology available for instructional use gained a weighted average of 2.88, as a barrier. At a 2.71 weighted average, technical support from district personnel played a role in qualifying as a legitimate barrier for technology use within the classroom. Teacher knowledge and skill of using and implementing technology-driven lessons served as a barrier with a weighted average of 2.67. The location of the technology in labs and various locations for check-out, the lack of professional development, and the evolution of equipment in today's world scored an average score of 2.50 in serving as barriers in technology use within the classroom for teachers. A student's lack of technology skill in lab and classroom settings attended in collecting an average weighted score of 2.46, while the lack of software available scored a 2.42. The final barrier that scored a 1.96 out of 4.00 with ABC Elementary School teachers was the lack of administrative support. This indicated that participants somewhat disagree with the role of the administration of the school serving as a barrier for their use of technology within the classroom. In all, the barriers identified within this research project scored a mean average of 2.7 out of 4.00. This indicated that the barriers used within this study align closer to the participants somewhat agreeing with

the obstacles that prevent technology use within their individual classroom at ABC Elementary School.

As indicated in table 10, the survey results specified that the participants express and somewhat agree that the barriers affected the use of technology within their classroom. The $\bar{x}=2.7$ which correlated with the survey scale for somewhat agree with the questions expressed for the participants. In table eight, each individual barrier is displayed with the results given by the participants.

Research Question 2: What are the benefits perceived by teachers in using technology within their individual classroom?

The benefits used within this study were collected based on their popularity in other research studies conducted by fellow educators in the field (Coleman, Gibson, Cotton, Howell-Moroney, & Stringer; Hsu; Brenner & Brill; Carver; Domingo & Gargante; & Yesilyurt, Ulas, & Akan). The benefits evaluated within this study were increases student engagement, increases student achievement, method of differentiation, opportunity to work on research skills, provides more current content information, creates a more flexible learning environment, promotes collaborative learning, saves time and effort, helps me organize my work, promotes teacher-student-parent communication, promotes creativity and self-expression, and improves retention rate.

Table 8. Survey Results for Barriers Based on Participant Breakdown

BARRIERS

To what extent do the following barriers affect the use of technology within YOUR classroom?

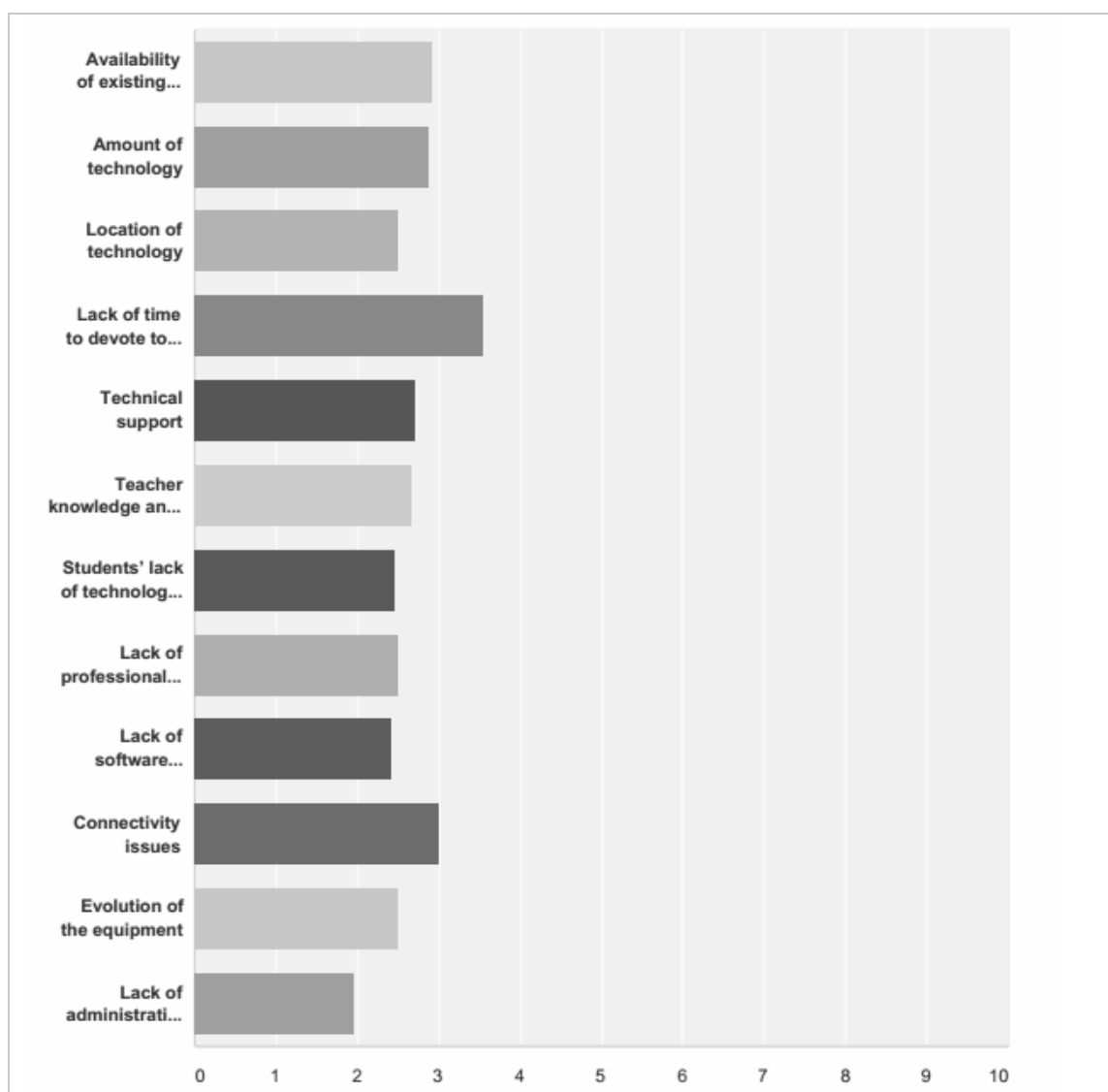


Table 8. Continued

BARRIERS	Strongly disagree (1)	Somewhat disagree (2)	Somewhat agree (3)	Strongly agree (4)	Total	Weighted average
Availability of existing technology	12.50% (3)	12.50% (3)	45.83% (11)	29.17% (7)	24	2.92
Amount of technology	8.33% (2)	20.83% (5)	45.83% (11)	25.00% (6)	24	2.88
Location of technology	16.67% (4)	33.33% (8)	33.33% (8)	16.67% (4)	24	2.50

Lack of time to devote to the creation and implementation of technology integrated lessons	0.00% (0)	8.33% (2)	29.17% (7)	62.50% (15)	24	3.54
Technical support	16.67% (4)	16.67% (4)	45.83% (11)	20.83% (5)	24	2.71
Teacher knowledge and skill	16.67% (4)	25.00% (6)	33.33% (8)	25.00% (6)	24	2.67
Students' lack of technology skills	12.50% (3)	33.33% (8)	50.00% (12)	4.17% (1)	24	2.46
Lack of professional development	16.67% (4)	37.50% (9)	25.00% (6)	20.83% (5)	24	2.50
Lack of software available	12.50% (3)	45.83% (11)	29.17% (7)	12.50% (3)	24	2.42
Connectivity issues	4.17% (1)	33.33% (8)	20.83% (5)	41.67% (10)	24	2.50
Evolution of the equipment	12.50% (3)	33.33% (8)	45.83% (11)	8.33% (2)	24	2.50
Lack of administrative support	41.67% (10)	25.00% (6)	29.17% (7)	4.17% (1)	24	1.96

The researcher found that the benefits play a role in the usage of technology within the classroom. The benefits collected by research materials show to have a significant advantage within the classroom based on their rankings in table six.

The benefits identified within this study created a higher mean in teacher's using technology within their individual classrooms. The overall average mean for the benefits of technology equaled a 3.32 out of 4.00 which specifies a somewhat agree mentality

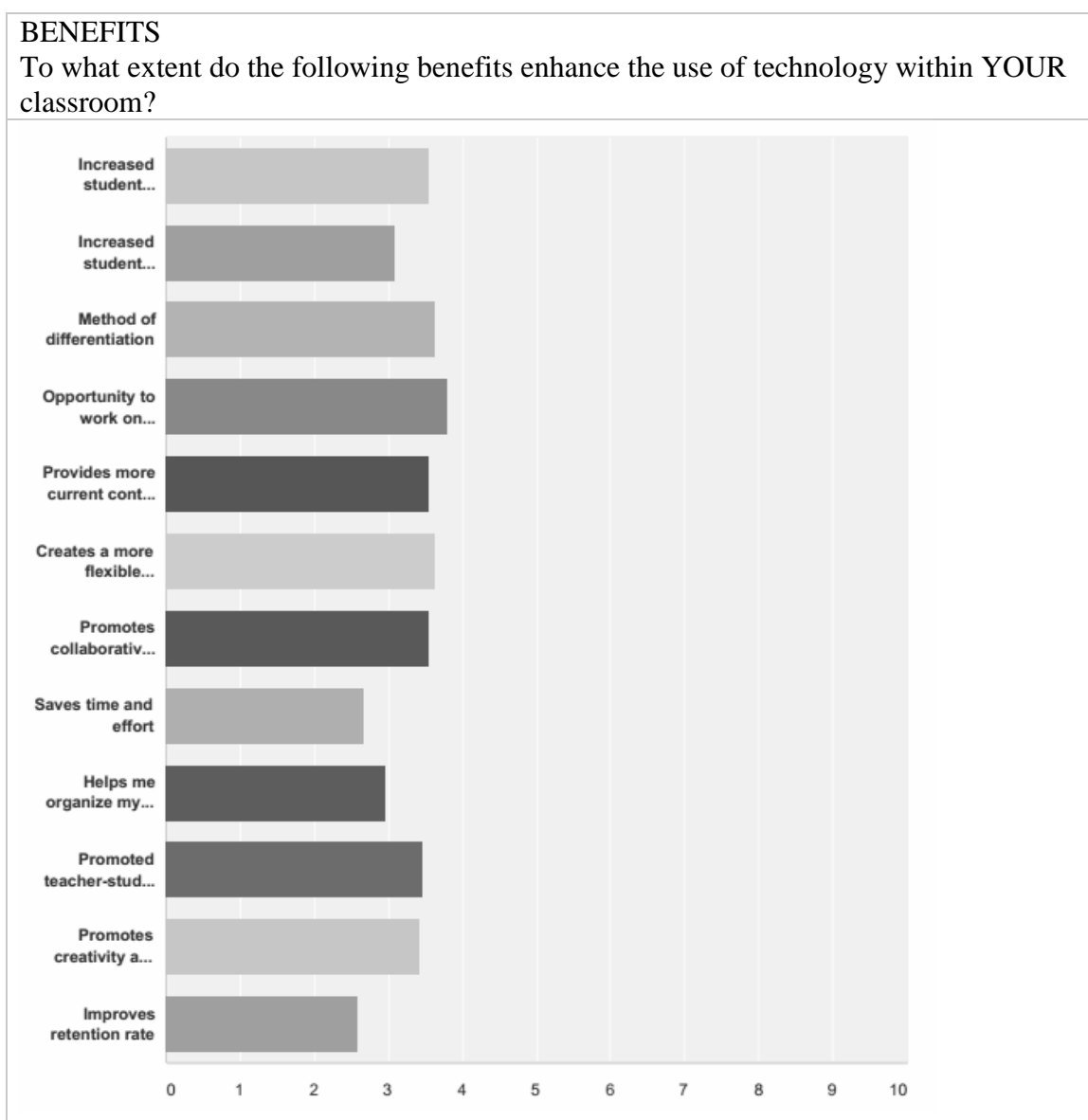
among participating teachers but was a 0.65 difference between the barriers and the benefits of using technology within the individual classroom. The highest ranking benefit of using technology was the opportunity to work on research skills scoring a 3.79 out of 4.00, which indicated a somewhat agree response but only 0.21 points from a strongly agree rating among participants. The second grouping of benefits identified by the participants were the creation of a more flexible learning environment and method of differentiation that scored a 3.63 out of 4.00, which indicated a somewhat agree ranking for this study. At 3.54, somewhat agree ranking, were increased student engagement, provides more current content information, and promotes a collaborative learning system. The promotion of teacher-student-parent communication benefit scored a 3.46 in somewhat agreeing that this benefit affected the use of technology within individual classrooms. The benefit of promoting creativity and self-expression scored a 3.42 out of 4.00 indicating that the participants somewhat agree in the effect that this element plays on technology use within the classroom. Lastly, in the somewhat agree's category of this research, the participants agreed that the use of technology within the classroom increased student achievement ranking at 3.08 out of 4.00. The final three benefits fall into the somewhat disagree's category of this study when trying to indicate the effectiveness in accordance with the use of technology within the classroom. The research participants categorized the following benefits into the somewhat disagree ranking because they reviewed the evidence of enhancement within the classroom was not evident. These benefits were identified as helps me organize my work at 2.96; saves time and effort at 2.67; and improves retention rate at 2.58.

The participants were given a survey to identify the benefits that they comprised to enhance their use of technology within their individual classroom. The results were calculated and analyzed to identify a rank order of the most beneficial benefits to the least effectiveness. After analyzed results were calculated, the researcher determined that the participating teachers thought that the use of computers within their classroom somewhat agree that the benefits enhanced their utilization with $\bar{x} = 3.22$. This indicated that the participants somewhat agree, which allowed for use to conclude that the benefits enhanced classroom functionality with the use of technology within the classroom which were evident in table nine.

Research Question 3: To what extent do teachers perceive a relationship between technology barriers and benefits within their individual classroom?

The participants in the study were asked a series of focus group questions that were created based on the benefits and barriers identified from various research articles used throughout the study (Coleman, Gibson, Cotton, Howell-Moroney, & Stringer; Hsu; Brenner & Brill; Carver; Domingo & Gargante; & Yesilyurt, Ulas, & Akan). These benefits and barriers were identified and discussed with the participants to ensure the meaning of the terms used were not misconstrued in any way during the focus group.

During the focus group, the participants communicated their experiences within the classroom using technology with students and/or professional responsibilities. Once the focus group was completed, the researcher transcribed the conversations obtained through the viewing of the recorded session. The information was reviewed by the researcher and the benefits and barriers were analyzed for possible relationships. The identified benefits were separated into tabular form. The researcher reviewed all

Table 9. Survey Results for Benefits Based on Participant Breakdown**Table 9. Continued**

BENEFITS	Strongly disagree (1)	Somewhat disagree (2)	Somewhat agree (3)	Strongly agree (4)	Total	Weighted average
Increased student engagement	0.00% (0)	4.17% (1)	37.50% (9)	58.33% (14)	24	3.54
Increased student achievement	0.00% (0)	12.50% (3)	66.67% (16)	20.83% (5)	24	3.08

Method of differentiation	0.00% (0)	0.00% (0)	37.50% (9)	62.50% (15)	24	3.63
Opportunity to work on researching skills	0.00% (0)	0.00% (0)	20.83% (5)	79.17% (19)	24	3.79
Provides more current content information	0.00% (0)	0.00% (0)	45.83% (11)	54.17% (13)	24	3.54
Creates a more flexible learning environment	0.00% (0)	0.00% (0)	37.50% (9)	62.50% (15)	24	3.63
Promotes collaborative learning	0.00% (0)	0.00% (0)	45.83% (11)	54.17% (13)	24	3.54
Saves time and effort	8.33% (2)	29.17% (7)	50.00% (12)	12.50% (3)	24	2.67
Helps me organize my work	4.17% (1)	25.00% (6)	41.67% (10)	29.17% (7)	24	2.96
Promoted teacher-student-parent communication	0.00% (0)	4.17% (1)	45.83% (11)	50.00% (12)	24	3.46
Promotes creativity and self-expression	0.00% (0)	12.50% (3)	33.33% (8)	54.17% (13)	24	3.42
Improves retention rate	12.50% (3)	29.17% (7)	45.83% (11)	12.50% (3)	24	2.58

responses to seek barriers that were identified in reaction to the mention of all benefits used within this study. The following table highlighted the barriers surveyed and discussed during the focus group. Along with these barriers, there are benefits that were mentioned by participants as possible solutions to correct or eliminate the barrier discussed in the focus group. Table 10 displays the results collected for benefits and

barriers and the relationship between the two as stated in the focus group by survey participants.

Table 10. Barrier and Benefit Relationships

Barriers	Correlated Benefit	Benefit	Correlated Barrier
Lack of time to devote to the creation and implementation of technology integrated lessons	<ul style="list-style-type: none"> ● Increased student engagement ● Increased student achievement ● Provides more current content information ● Method of differentiation ● Promotes creativity and self-expression 	Opportunity to work on research skills	<ul style="list-style-type: none"> ● Connectivity issues ● Technical support ● Students' lack of technology skills
Connectivity issues	<ul style="list-style-type: none"> ● Method of differentiation ● Creates a more flexible learning environment ● Promotes collaborative learning 	Method of differentiation	<ul style="list-style-type: none"> ● Lack of professional development ● Lack of time to devote to the creation and implementation of technology integrated lessons

Table 10. Continued

Availability of existing technology	<ul style="list-style-type: none"> ● Promotes collaborative learning ● Method of Differentiation ● Creates a flexible learning environment 	Increased student engagement	<ul style="list-style-type: none"> ● Lack of time to devote to the creation and implementation of technology integrated lessons ● Lack of software available ● Students' lack of technology skills ● Connectivity issues
Amount of technology	<ul style="list-style-type: none"> ● Promotes collaborative learning ● Creates a flexible learning environment 	Promotes teacher-student-parent communication	<ul style="list-style-type: none"> ● Technical support ● Connectivity issues
Technical support	<ul style="list-style-type: none"> ● Promotes collaborative learning 	Promotes creativity and self-expression	<ul style="list-style-type: none"> ● Lack of administrative support ● Lack of time to devote to the creation and implementation of technology integrated lessons

Table 10. Continued

Teacher knowledge and skill	<ul style="list-style-type: none"> • Promotes collaborative learning • Method of differentiation • Saves time and effort 	Increase student achievement	<ul style="list-style-type: none"> • Lack of time to devote to the creation and implementation of technology integrated lessons • Lack of software available • Students' lack of technology skills • Connectivity issues
Location of technology	<ul style="list-style-type: none"> • Promotes collaborative learning 	Helps me organize my work	<ul style="list-style-type: none"> • Lack of software available • Teacher knowledge and skill

Students' lack of technology skills	<ul style="list-style-type: none"> • Method of differentiation • Opportunity to work on research skills • Provides more current content information • Creates a more flexible learning environment • Promotes creativity and self-expression 	Saves time and effort	<ul style="list-style-type: none"> • Technical support • Connectivity issues • Lack of time to devote to the creation and implementation of technology integrated lessons • Teacher knowledge and skill • Lack of professional development
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Table 10. Continued

Lack of software available	<ul style="list-style-type: none"> • Creates a more flexible learning environment • Promotes collaborative learning 	Improves retention rate	<ul style="list-style-type: none"> • Lack of software available • Teacher knowledge and skill • Lack of time to devote to the creation and implementation of technology integrated lessons
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Lack of administrative support	<ul style="list-style-type: none"> • Method of differentiation • Promotes collaborative learning • Promotes creativity and self-expression 	Creates a more flexible learning environment	<ul style="list-style-type: none"> • Teachers knowledge and skill • Lack of software available • Students' lack of technology skills
Lack of professional development	<ul style="list-style-type: none"> • Promotes collaborative learning • Method of differentiation • Creates a more flexible learning environment 	Provides more current content information	<ul style="list-style-type: none"> • Connectivity issues • Teacher knowledge and skill • Lack of time to devote to the creation and implementation of technology integrated lessons

Table 10. Continued

Evolution of the equipment	<ul style="list-style-type: none"> ● Opportunity to work on research skills ● Promotes collaborative learning ● Promotes creativity and self-expression 	Promotes collaborative learning	<ul style="list-style-type: none"> ● Lack of administrative support ● Location of technology
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The following will elaborate and explain the relationship identified with the benefits and barriers communicated by the focus group participants and in table 10.

Table 11. Availability of Existing Technology with Focus Group Benefits

BARRIERS	BENEFITS
Availability of existing technology	Promotes collaborative learning
	Method of differentiation
	Creates a more flexible learning environment

The availability of existing technology accessible within ABC Elementary School is contained to two mobile carts of 25 laptops, two stationary labs with 30 desktop computers for student use, and 6 student computer stations within each individual classroom. The two mobile carts are available upon check-out from the technology department, and these two carts must serve 24 teachers. The two stationary labs have a schedule set at the beginning of the year for all 24 classes to rotate in and out two times a week. While teachers measured this barrier within the somewhat disagree category that this barrier is an issue in their perception of technology use with a $\bar{x}=2.92$, there were still benefits that were identified that serve as possible solutions to this problem.

With the barrier of availability of existing technology, participants would promote collaborative learning for groups of students through the implementation of centers or stations. Participants would capitalize on this barrier by allowing students to work at a level that meets their needs by providing them with a differentiated curriculum or assignment. This would allow for a more flexible learning environment that allowed students to create their own learning experience and accountability by teaching to various learning styles for all learners.

Table 12. Amount of Technology with Focus Group Benefits

BARRIERS	BENEFITS
Amount of technology	Promotes collaborative learning
	Creates a more flexible learning environment

The amount of technology available at ABC Elementary School for student and teacher use totals 254 computers. This number includes the mobile/stationary labs and the 6 student stations within each of the 24 classrooms. With a total of 571 students, this equals 2.25 students for every computer available at the school. This computer to student ratio is aligned with the benefits that were exposed during the focus group.

The barrier of the amount of technology falls into the somewhat disagree category of concern for technology use within the classroom with a 7 score of 2.88. Although this barrier is a concern among teachers, there are benefits that balance this deficit expressed by the participants in the focus group. The benefit of promoting collaborative learning is crucial considering the student to computer ratio available at the school. By implementing a flexible learning environment, the teacher creates an atmosphere of tiered learning, independent work, small group, etc..., that benefits all learners.

Table 13. Location of Technology with Focus Group Benefits

BARRIERS	BENEFITS
Location of technology	Promotes collaborative learning

The location of the technology within ABC Elementary School is all localized within one building, except for the six student stations within each classroom.

Participants expressed that the location of the technology restricts the spontaneity of spin off lessons that could be used during a particular time frame, due to the location of the devices. This location justifies why participants marked the somewhat disagreed category with a 7 score of 2.5 for this barrier. This barrier is complemented with the collaborative learning benefit, due to the lack of equipment and the location within the school.

Table 14. Lack of Time to Devote to the Creation and Implementation of Technology Integrated Lessons with Focus Group Benefits

BARRIERS	BENEFITS
Lack of time to devote to the creation and implementation of technology integrated lessons	Increases student engagement
	Increases student achievement
	Provides more current content information
	Promotes creativity and self-expression
	Method of differentiation

The barrier that refers to the lack of time to devote to the creation and implementation of technology integrated lessons is one that the participants at ABC Elementary School found the most important. With a 7 score of 3.54, participants placed this barrier within the strongly agree category of technology use within the classroom, thus meaning that this barrier causes the most resistance in implementing technology within the classroom. Participants do not have the time to create these lessons because of

home and other work obligations. They also expressed the concern that connectivity and functionality dissolve any time available in implementing these lessons. Although these many concerns justify the popularity of this barrier, there were several benefit relationships that were mentioned in the focus group.

The benefits of increased student engagement and achievement were mentioned by the participants because the use of technology excites the students and apps/games were implemented with the students. This implementation of games and various apps allowed students to reinforce and practice skills while engaged with fun experiences. This technique of instruction also allows students to engage material that is more up-to-date than textbooks and teaching materials and creates a more interesting atmosphere for learning than the teacher. In providing students with this type of learning, the teacher is offering a form of differentiation that meets the needs of their students. In allowing students to become involved in this form of learning, their creativity and self-expression exudes in the product created by the students.

Table 15. Technical Support with Focus Group Benefits

BARRIERS	BENEFITS
Technical support	Promotes collaborative learning

The barrier of technical support within the ABC Elementary School is maintained by the school district representatives assigned to the schools. This school also has a technology coordinator and technology teacher present to assist in the troubleshooting stage of correcting various technical issues within the school. This barrier received a 2 score of 2.71 that qualifies it within the somewhat disagree category on the survey. Participants expressed frustration in planning academic lessons that utilize technology

because of unpredictability of the technology within the building, and with this unpredictability of performance, technical support is unavailable upon immediate request.

Although this barrier causes frustration for participants to utilize within the classroom, there was a benefit that was mentioned that could possibly solve the issue. It was revealed that many students know more about technology than teachers because of their digital native status. Then, it seems appropriate to pair the benefit of collaborative learning to this barrier. Students could use each other's strengths in technical support to solve the issue that exists with their assigned piece of technology.

Table 16. Teacher Knowledge and Skill with Focus Group Benefits

BARRIERS	BENEFITS
Teacher knowledge and skill	Promotes collaborative learning
	Method of differentiation
	Saves time and effort

The barrier of teacher knowledge and skill refers to the ability to implement technology within the classroom that supports academic content appropriately. It was mentioned by participants that teachers that use technology do not always implement it in the correct way that promotes academic achievement. Some implement technology with students using a remediation type program that allows students to practice skills. With a 2 score of 2.67, this qualifies the barrier to fall within the somewhat disagree category of barriers that effect technology use within the classroom.

Although this barrier recorded a considerable score in the survey, there are benefits that correlate based on the focus group communication. Participants expressed that the use of technology mentor, teacher pairings among the faculty could serve as support for teaching and answering questions that deal with technology use which refers

to the benefit of collaborative learning. The method of differentiation was mentioned by the participants in learning how to use technology in the classroom. The participants need that hands-on, immediate practice of the skill in order to use technology in the classroom. Lastly, the benefit of saves time and effort creates an environment that allows participants explore the various ways that technology is used to allow teachers the freedom from reinventing the wheel each year. In learning how to use technology in appropriate ways, as the teacher, files and documents utilized each year become more accessible for the teacher.

Table 17. Students' Lack of Technology Skills with Focus Group Benefits

BARRIERS	BENEFITS
Students' lack of technology skills	Method of differentiation
	Opportunity to work on research skills
	Provides more current content information
	Creates a more flexible learning environment

The barrier of students' lack of technology skills is one that refers to the ability possessed by students to use technology within the classroom. This barrier scored a 2 of 2.46 which means that participants somewhat disagree that this obstacle provides any significant obstruction to the use of technology within the classroom. Although it is not considered a significant barrier, there are benefits that correlate based on the focus group responses.

During the focus group, participants mentioned that with the use of technology in the classroom setting, students are provided a source of differentiation. Students are allowed to use various apps and software that take the place of manipulatives and worksheets. In improving these technology skills that pose a barrier, the students are

exposed to current content and provided opportunities to master research skills. The use of flexible learning environments creates an atmosphere for allowing the students to work at their own pace. This allows students that struggle with this barrier to capitalize on a benefit to improve this deficit. While this barrier did not have a significant 2 score, there were several benefits that compliment this obstacle to provide support.

Table 18. Lack of Professional Development with Focus Group Benefits

BARRIERS	BENEFITS
Lack of professional development	Promotes collaborative learning
	Method of differentiation
	Creates a more flexible learning environment

The lack of professional development is a barrier that refers to those opportunities that teachers are not afforded the ability to learn skills that benefit their profession. In this case, the teachers feel that professional development plays a crucial role in technology use within the classroom. With a 2 score of 2.5, participants somewhat disagree that this barrier prevents the use of technology within the classroom. Participants also mentioned benefits that would assist in the use of technology more often in the classroom.

Participants stated that the use of technology mentors throughout the building would provide novice users support in implementing various aspects of technology. These mentors would be considered teachers that use technology with their students on a continuous basis. This would serve as the benefit that promotes collaborative learning while creating a flexible learning environment. Faculty meetings and in-house idea fairs where teachers exhibit the way they use technology within their classrooms would provide that flexible learning environment for participants to learn and implement at their own pace. It was also mentioned by the participants, during the focus group, that

opportunities to observe teachers throughout the building using technology in their classroom would provide a method of differentiation for the teachers.

Table 19. Lack of Software Available with Focus Group Benefits

BARRIERS	BENEFITS
Lack of software available	Creates a more flexible learning environment
	Promotes collaborative learning

The barrier that deals with the lack of software availability refers to the resources available through the county and school that supplement academics within the classroom. With a 2 score of 2.42, participants somewhat disagreed, based on the survey, that this barrier posed a problem with the use of technology within the classroom. However, participants did mention during the focus group that district employees and students are when programs and software are not available for remediation of content. They also stated that some students get frustrated with the use of technology and the many glitches that ensue with using it thus settling for pencil/paper. Although this barrier was supported with many references to the focus group participants, there were many benefits that were revealed during the discussion.

The creation of a flexible learning environment is one benefit that was exposed during the focus group session. While teachers know that circumstances arise during the use of technology, they provide a flexible learning environment where all students have the opportunity to rotate on and off the computers. This allows for all students to use the software that is available on a limited amount of devices in the classroom. Allowing for collaborative learning experiences was another benefit that afforded students the ability to use important software that maximized the teaching for the day.

Table 20. Connectivity Issues with Focus Group Benefits

BARRIERS	BENEFITS
Connectivity issues	Method of differentiation
	Creates a more flexible learning environment
	Promotes collaborative learning

Connectivity issues while using technology within the classroom was a vast barrier that was mentioned a lot in the discussion of trying to implement this use of equipment. This barrier ranked second highest in participants somewhat agreeing that it affects the use of technology with the classroom. With a 7 score of 3.00, participants find this barrier to be troublesome. Participants referred to this barrier unpredictable and a cause for frustration among teachers. There are some benefits that were cited throughout the focus group.

Participants use the method of differentiation and flexible learning environments when using technology in the classroom while experiencing connectivity issues. Students are given options on how to utilize the equipment when producing materials that are driven by the equipment. Participants find ways with choice boards or collaborative learning opportunities to maximize the usage of spotty connectivity issues throughout the building.

Table 21. Evolution of the Equipment with Focus Group Benefits

BARRIERS	BENEFITS
Evolution of the equipment	Opportunity to work on researching skills
	Promotes collaborative learning
	Promotes creativity and self-expression

The barrier of evolution of the equipment refers to the time frame that the technology is experiencing in age and functionality. All technology has a life span and becomes a problem when used past the prime period of functionality. Participants somewhat disagree that this barrier poses a problem with the use of technology in the classroom with a 2 score 2.5. Although the fruition of some technology is at its prime, there are still some benefits mentioned that could be used in the implementation process within the classrooms.

The refinement of research skills on dated equipment is a benefit that seems appropriate by participants. The benefit of collaborative learning could be another benefit that saves on the life of the technology. Many students benefit from the work of one person when establishing a collaborative learning situation. This type of learning also creates an atmosphere for self-expression and creativity. Students are afforded the opportunity to design their own creation with the tools that they are given with older materials.

Table 22. Lack of Administrative Support with Focus Group Benefits

BARRIERS	BENEFITS
Lack of administrative support	Method of differentiation
	Promotes collaborative learning
	Promotes creativity and self-expression

The lack of administrative support for using technology within the classroom falls on the shoulders of the leader within the school. Within ABC Elementary School, the participants feel that the administrator should be supportive in allowing teachers to explore their own endeavors when trying to use technology in the classroom. This barrier did not score favorable among participants within the survey. With a 2 score of 1.96, participants strongly disagree that this barrier poses a problem among their usage of technology in the classroom.

The focus group highlighted some benefits that would cause participants and administrators to explore this barrier more in-depth. Participants expressed the need for a method of differentiation when using technology in their classrooms. This method of differentiation should be tailored for the type of user and their ability level when using technology. The promotion of collaborative learning is another benefit that would allow participants to move at their own pace when implementing technology into their classrooms. Participants could be paired with grade-level teachers to discover this process together. Finally, administrators could allow participants to delve deep into their own comfort level in using technology in the classroom that exposes their own self-expression and creativity. This self-expression and creativity could develop over time in the ways the usage is handled by the participants.

Table 23. Increased Student Achievement and Student Engagement with Focus Group Barriers

BENEFITS	BARRIERS
Increased student achievement & increased student engagement	Lack of time to devote to the creation and implementation of technology integrated lessons
	Connectivity Issues
	Lack of software available
	Students' lack of technology skills

The benefit of increasing student achievement and student engagement using technology within the classroom ranked high among participants within the somewhat agree category of affecting usage. While increasing student engagement scored a \bar{x} of 3.54 and increasing student achievement scored a \bar{x} of 3.08, they both serve a purpose within the classroom implemented by the use of technology. There are barriers that were mentioned among participants that cause resistance among those in the classroom.

Some of the barriers that were mentioned, in regards to increasing student engagement and student achievement, were the lack of time to devote to the creation and implementation of technology integrated lessons. Participants did not have the time to devote to creating lessons, due to the demands of other facets of education and family dynamics. The focus group conversation also pinpointed the unpredictability of connectivity issues while using technology in the classroom. Another barrier that causes concern for participants was the lack of software available that promotes that student engagement to foster student achievement among students. Participants find themselves

searching for long periods of time at home for the perfect software to engage students and connectivity issues derail that plan of action. The lack of students' technology skills also is a barrier that limits the usage of technology within the classroom. Participants need for students to know how to use the technology in order to implement it within the classroom. When students do not know the various pieces of equipment or how to use them, this stifles the engagement and achievement that is being promoted within the classroom.

Table 24. Method of Differentiation with Focus Group Barriers

BENEFITS	BARRIERS
Method of differentiation	Lack of professional development
	Lack of time to devote to the creation and implementation of technology integrated lessons

The benefit of fostering a method of differentiation for students using technology was an identified advantage among participants. Participants use various forms of differentiation with all students in implementing a classroom curriculum with the assistance of technology. Technology serves students in flexible learning environments when teachers have many learning situations occurring within the classroom. This benefit calculated a \bar{x} score of 3.63 which means that participants somewhat agree with the usage of technology in the classroom using this type of method.

In strongly agreeing with this benefit, some participants found barriers that correlate with the usage of this type of implementation within the classroom. The lack of professional development was one barrier that was perceived to cause difficulty for this benefit. Participants discussed that placing students on various programs or software does not justify the term of differentiation usage among students. Teachers need more training

and professional development to understand the term differentiation and how technology could play a role in the classroom. Another barrier mentioned during the focus group was the lack of time to devote the creation and implementation of integrated technology lessons. Participants expressed their resistance to use technology as a method of differentiation because they do not have time to search for ways to implement this type of instruction. Many times professional development on technology usage within the classroom is presented during inopportune times when teachers are focused on other extra-stimuli, like summer vacations, winter breaks, or pre-planning. Participants would be more willing to implement this type of learning, if there were more hands-on opportunities throughout the year to practice what is learned at trainings.

Table 25. Opportunity to Work on Researching Skills with Focus Group Barriers

BENEFITS	BARRIERS
Opportunity to work on researching skills	Connectivity issues
	Technical issues
	Students' lack of technology skills

The benefit of providing students the opportunity to work on research skills was the top ranked opportunity that participants believed was most affective in technology usage among students. This benefit received a 7 score of 3.79 which equates to participants somewhat agreeing with technology usage in this manner. This benefit allows students to practice their research skills with the most current content available to them, and it allows them to practice on those technology skills that are important in gaining insight within a 21st century learner.

Although this benefit ranked the highest among participants, there are still barriers that oppose the usage of technology within the classroom for this purpose. Connectivity

issues and technical support are two barriers that cause major disorder among this benefit. Participants expressed their concern about the connectivity to the internet within the building at ABC Elementary School. The Wi-Fi is spotty and unreliable which leads to the hesitation among participants. Technical support is not dependable in assisting with connectivity issues and any other needed support, as technicians are shared among several schools, so their punctuality in addressing problems does not have the best reputation. Finally, the barrier of a students' lack of technology skills provides an obstacle when trying to use technology for these research skills. If students do not know how to manipulate the equipment, their ability to manipulate the World Wide Web is not highly attainable.

Table 26. Provides More Current Content Information with Focus Group Barriers

BENEFITS	BARRIERS
Provides more current content information	Connectivity issues
	Teacher knowledge and skill
	Lack of time to devote to the creation and implementation of technology integrated lessons

The benefit of providing more current content information is one that sales the attractability of this advantage. Most all participants expressed their understanding that the World Wide Web is a place that houses the most beneficial information in the world. In studying the 7 score received by participants of 3.54, it is passable to say that this benefit is deemed significant for technology use. Participants somewhat agree that the most current content available for students is housed within the walls of technology.

With this justified benefit, the participants come to identify barriers that correlate with the benefit to cause trouble. Connectivity issues can definitely cause issues with

searching the internet for the most current content available. This barrier has been discussed on numerous occasions with benefits and barriers. The lack of time to devote to the creation and implementation of technology integrated lessons is a barrier that participants identified as an obstacle in technology usage. This barrier becomes an issue because participants do not know what to do with this current content for students which leads to frustration and alienation with the technology. Teacher knowledge and skill is intertwined with both knowing the content but not knowing how to use the technology in order to implement a lesson using it. Participants need continuous support in using technology to foster this type of learning.

Table 27. Creates a More Flexible Learning Environment with Focus Group Barriers

BENEFITS	BARRIERS
Creates a more flexible learning environment	Teacher knowledge and skill
	Lack of software available
	Students' lack of technology skills

The creation of a more flexible learning environment is a benefit that allows participants the freedom to arrange instruction with various modes of delivery for students. This benefit seems most prevalent with the participants too. The 7 score of 3.63 indicates that participants somewhat agree that this benefit is highly effective when using technology within the classroom. Participants find that this benefit allows students the freedom to explore learning within their comfort level accessing information that best suits their needs.

With high markings, this benefit seems to play a significant role in technology use within the classroom, but the participants still exposed barriers that hinder the appearance of this benefit at times. Teacher knowledge and skill could play a role in the demise of

this benefit. If teachers are uncomfortable utilizing this form of instruction, due to the lack of experience and other various concerns, then the benefit of flexible learning is not as crucial within the classroom. If participants feel that the availability of software and programs are not accessible for the students, then the use of this benefit will not exist. Finally, participants indicated that the students' lack of technology skills causes problems within various locations where technology is implemented during the school day. If this barrier postures itself within technology usage to cause any problem for the participants, reluctance will eliminate the use of flexible learning for participants and students within the classroom.

Table 28. Promotes Collaborative Learning with Focus Group Barriers

BENEFITS	BARRIERS
Promotes collaborative learning	Lack of administrative support
	Location of technology

The benefit of promoting collaborative learning refers to those opportunities when teachers provide students the opportunity to work with their peers on project or assignments. In this case, it is with the use of technology in the classroom setting. This benefit was one that received a 7 score of 3.54 that qualifies it within the somewhat agree category of affecting the use of technology within the classroom. Some barriers were identified as a possible hindrances in using technology to promote collaborative learning.

Some possible barriers that were mentioned by the participants include the lack of administrative support and the location of the technology available within ABC Elementary School. The lack of administrative support was included because participants stated that without the administrator's knowledge of how to incorporate technology appropriately, this type of incorporation alignment would not be beneficial or allowed

within the classrooms. Participants want the administrator to respect the role of the teacher within his or her own classroom to incorporate lessons that fit the needs of their students. Another barrier that was addressed with this benefit would be the location of the technology within the school. Collaborative learning is hard to accomplish if the equipment is checked out to other participants within the building. When the location of the technology throughout the building is compromised, planned collaborative efforts are null and void.

Table 29. Saves Time and Effort with Focus Group Barriers

BENEFITS	BARRIERS
Saves time and effort	Technical support
	Connectivity issues
	Lack of time to devote to the creation and implementation of technology integrated lessons
	Teacher knowledge and skill
	Lack of professional development

The benefit of using technology within the classroom saves time and effort was one that participants referred to as beneficial, if all barriers remained dormant. Participants mentioned that technology saves time and effort when time is set aside to create lessons that transfer over from year-to-year and professional development is granted to those teachers that use software to assist in the duties of education. With a 2 score of 2.67, this benefit was ranked within the somewhat disagree category as having an effect within the classroom. Although this benefit was agreed upon as providing an effect to using technology within the classroom, there were still several barriers that were mentioned that stagnate this process.

Connectivity issues and technical support are two barriers that ignite frustration among participants quite often and deter participants from using technology within the classroom. Participants expressed their frustration when attempting to use Wi-Fi for classroom activities, and the student experience spotty reception and delays in speed. Bring Your Own Device (BYOD) is attempted in the classroom and the connectivity and technical support of outside devices defer attention to other distractions besides the plan of action prepared by the teacher. The lack of time to devote to the creation and implementation of technology integrated lessons does not save time and effort for teachers that lack the knowledge and skill due to the deficiency in professional development to attempt these types of endeavors. If participants do not know how to use the technology in meaningful ways, their efforts are useless. Participants acknowledged the need for professional development because of the vast amount of programs and software available for students to use with technology.

Table 30. Helps me Organize my Work with Focus Group Barriers

BENEFITS	BARRIERS
Helps me organize my work	Lack of professional development
	Teacher knowledge and skill

The benefit that refers to technology use helping participants organize their work received a 7 score of 2.96. This score interpreted means that the participants within this study somewhat disagree that technology helps teachers organize their work. Participants mentioned that the numerous amount of apps and software available creates and provides various means for them to organize their content and curriculum. With the use of these various apps and software, teachers are allowed the opportunity for many of their tasks to be completed using these items from grading their papers, remediating students,

providing data for academic decisions, and acceleration of curriculum with reports of progress. Although this benefit scored admirable among participants, there were still some barriers that were revealed that cause hesitation of use.

Some participants were reluctant to implement apps and software that were unknown to them, due to the lack of use. Their fear stemmed from the lack of professional development and their knowledge and skill on how to use identified apps and programs. Without professional development on these various items, the participants that their repertoire of technology skills would not advance into using new and innovative apps and software. Their continued use of the same dated technology items would continue to be a stronghold on branching out to new ways of accomplishing tasks. Without the professional development on these apps and software, the participants skill set would not progress into one that would reap the benefits of its use within the classroom.

Table 31. Promoted Teacher-Student-Parent Communication with Focus Group Barriers

BENEFITS	BARRIERS
Promoted teacher-student-parent communication	Technical support
	Connectivity issues

The benefit that promotes teacher, student, and parent communication received a 2 score of 3.46 out of 4 which signifies the importance identified by participants. This score means that the participants somewhat agree that this benefit plays an integral part in the effect that technology usage plays within the classroom. Participants agreed that the use of technology to inform and communicate with parents and students about any school-related business immediately is a necessity today. Even with the immediate

attention to school-related business available at the push of a button, there are still barriers that prevent the ease of using technology within the classroom.

Participants identified the lack of technical support as a barrier to the use of technology within the classroom setting. Connectivity issues were also recognized as a barrier that interferes with the usage of technology among participants. Participants find it hard to communicate with parents and students about school-related business when these elements manage to interrupt the delivery of important information.

Table 32. Promotes Creativity and Self-Expression with Focus Group Barriers

BENEFITS	BARRIERS
Promotes creativity and self-expression	Lack of administrative support
	Lack of time to devote to the creation and implementation of technology integrated lessons

The benefit that refers to the promotion of creativity and self-expression received a 2 score of 3.42 overall. This indicates that participants somewhat agree with this benefit causing an effect upon the usage of technology within the classroom. The promotion of creativity and self-expression is a benefit that allows each individual student the opportunity to direct their focus and display their academic ability in a variety of ways using technology. With the popularity of this benefit, there were still barriers that were revealed that cause dissention of use among participants.

The barriers that were highlighted as possible deterrents of use among participants were the lack of administrative support and lack of time to devote to the creation and implementation of technology integrated lessons. The lack of administrative support is a barrier that could cause problems among participants, due to the appearance of delivery

of content. This academic delivery is one that would be student-centered and driven, so there would seem to be no supervision during instruction. Another barrier would be the lack of time to devote to the creation and implementation of technology integrated lessons. This type of instruction takes time to prepare for on the participants end, hence the resistance to this form of usage within the classroom.

Table 33. Improves Retention Rate with Focus Group Barriers

BENEFITS	BARRIERS
Improves retention rate	Lack of software available
	Teacher knowledge and skill
	Lack of time to devote to the creation and implementation of technology integrated lessons

The benefit that refers to the usage of technology providing an avenue to improve retention rate among students was the lowest ranked with a 7 score of 2.58. This equates to participants somewhat disagreeing that this benefit plays a role in the effect that technology usage produces within the classroom. Participants indicated that this benefit provided more reinforcement and spiraling of information taught in class while using a variety of apps and software to review academic content. While beneficial, some participants express that this benefit aligns with barriers that hinder the use of technology within the classroom.

While some responses support this benefit, there were many comments during the focus group that raise concern in the effect that using technology within the classroom plays on the teacher's perception of use. Participants stated that the lack of software available that does more than drill and kill concepts to remediation of skill and retention of academic material is a problem for students and teachers. Participants mentioned that

the students need to display their mastery of academic content using technology-based lessons to expose their retention of material. The lack of time to devote to the creation and implementation of technology integrated lessons creates a problem because teachers use technology in non-structured ways to serve as babysitters to practice academic concepts. This refers to teacher knowledge and skill too. Participants revealed that when technology is used as a babysitter because teachers do not want to plan lessons that serve meaningful purposes, the teacher releases some control of his or her effectiveness to connect with the students outside of the computer screen.

Table 34. Likert Category for Barriers

BARRIER	Likert Category
Lack of time to devote to the creation and implementation of technology integrated lessons	Somewhat Agree
Connectivity issues	Somewhat Agree
Availability of existing technology	Somewhat Disagree
Amount of technology	Somewhat Disagree
Technical support	Somewhat Disagree
Teacher knowledge and skill	Somewhat Disagree
Location of technology; Lack of professional development; Evolution of the equipment	Somewhat Disagree
Students' lack of technology skills	Somewhat Disagree
Lack of software available	Somewhat Disagree
Lack of administrative support	Strongly Disagree

Summary

The research collected with the Likert-type survey concluded the following results in table 34. The lack of time to devote to the creation and implementation of technology integrated lessons and connectivity issues were the two barriers that participants identified as the most influential barriers that cause teachers to avoid the use of

technology within the classroom. All other barriers were not identified by the participants, in the survey, as causing resistance in using technology within the classroom with somewhat disagree and strongly disagree ratings using the Likert categories.

The significant barriers identified by the survey were mentioned within the focus group. Participants discussed the lack of time to create the lessons due to the timing of trainings provided by school district personnel. These trainings provide participants with a plethora of information within a short time span with limited or no practice of taught skills which causes the participants to disengage and focus on safe measures of academic delivery. Participants surveyed and interviewed in a focus group shared that the connectivity of devices caused delay and wasted instructional time within the classroom. While all other barriers were mentioned in the focus group, these two were referred to by participants in the majority of the questions and responses. Based on the results provided by the data, the researcher can conclude that the lack of time and participant's comfort level in resolving computer issues effects the use of technology with the teachers' classrooms.

Table 35. Likert Category for Benefits

BENEFITS	Likert Category
Opportunity to work on research skills	Somewhat Agree
Method of differentiation; Creates a more flexible learning environment	Somewhat Agree
Increased student engagement; Provides more current content information; Promotes collaborative learning	Somewhat Agree
Promotes teacher-student-parent communication	Somewhat Agree

Promotes creativity and self-expression	Somewhat Agree
Increase student achievement	Somewhat Agree
Helps me organize my work	Somewhat Disagree
Saves time and effort	Somewhat Disagree
Improves retention rate	Somewhat Disagree

The research collected with the Likert-type survey concluded the following results in table 35. Although participants did not rate the benefits as significantly impacting the use of technology within the classroom, there are several that created somewhat of an advantage for participants. The benefits of allowing students to work on research skills, providing a method of differentiation, more flexible and collaborative learning, increases student engagement and achievement, provides more current content, communication, and more creative self-expression were all identified within the survey as beneficial for students. Likewise, the focus group identified and discussed the same benefits for learners in using technology within the classroom. Based on this information provided by the survey and focus group, the researcher can conclude that the benefits noted as beneficial for learners and participants within the classroom allow for the increased student productivity and learning. These significant benefits also serve as a useful tool to create learning opportunities for students that need additional support or acceleration while using technology within the classroom.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

With this study, the researcher sought to study the perceptions of teachers on technology use within the classroom. These perceptions were evaluated based on the identified benefits and barriers and the effect they had on technology use (Coleman, Gibson, Cotton, Howell-Moroney, & Stringer, 2016; Hsu, 2016; Brenner & Brill, 2016; Carver, 2016; Domingo & Gargante, 2016; & Yesilyurt, Ulas, & Akan, 2016). The participants were administered a Likert-type survey to collect their perceptions on technology use within the classroom while analyzing the selected benefits and barriers. After the data were generated based on the results of the survey, a focus group session was conducted to discuss the results of the survey. This focus group session dealt with the results of the survey and the teachers' perceptions of the most and least influential benefits and barriers and how they affect the use of technology within the classroom. The survey and focus group results were compared and cross analyzed in various tables and reported in Chapter IV. This method created a more in-depth analysis of the benefits and barriers and how teachers ranked them based on their use within the classroom.

This in-depth analysis of the benefits and barriers and how teachers perceived their importance in using technology within the classroom varied among participants. The lack of time to devote to the creations and implementation of technology integrated lessons and connectivity issues were barriers that received the most attention when participants discussed the use of technology within their classroom. The other barriers

discussed with the participants within the survey and focus group did not have a significant influence for the participants' use of technology within the classroom. The barriers mentioned above were confirmed as significant nuances that cause resistance in using technology within the classroom, as identified by the focus group session. Therefore, the researcher can conclude that the participants' skill in resolving technical difficulties and time play major roles in the integration of technology within the classroom.

Although no one benefit played a significant in the survey results and focus group, the participants communicated that most of the benefits play a small role in effecting the perceptions of teachers when using technology in the classroom. The benefits of allowing students to work on research skills, providing a method differentiation, more flexible and collaborative learning, increases student engagement and achievement, provides more current content, communication, and more creative self-expression all play a role in technology use within the classroom, as identified in surveys and focus group discussion.

Analysis of Research Findings

The lack of time to devote to the creation and implementation of technology integrated lessons and connectivity issues were the two barriers that participants identified as the most influential barriers that cause teachers to avoid the use of technology within the classroom. All other barriers were not identified by the participants, in the survey, as causing resistance in using technology within the classroom with somewhat disagree and strongly disagree ratings using the Likert categories.

The significant barriers identified by the survey were mentioned within the focus group. Participants discussed the lack of time to create the lessons due to the timing of trainings provided by school district personnel. These trainings provide participants with a plethora of information within a short time span with limited or no practice of taught skills which causes the participants to disengage and focus on safe measures of academic delivery. Participants surveyed and interviewed in a focus group shared that the connectivity of devices caused delay and wasted instructional time within the classroom. While all other barriers were mentioned in the focus group, these two were referred to by participants in the majority of the questions and responses. Based on the results provided by the data, the researcher can conclude that the lack of time and participant's comfort level in resolving computer issues effects the use of technology with the teachers' classrooms.

Although participants did not rate the benefits as significantly impacting the use of technology within the classroom, there are several that created somewhat of an advantage for participants. The benefits of allowing students to work on research skills, providing a method of differentiation, more flexible and collaborative learning, increases student engagement and achievement, provides more current content, communication, and more creative self-expression were all identified within the survey as beneficial for students. Likewise, the focus group identified and discussed the same benefits for learners in using technology within the classroom. Based on this information provided by the survey and focus group, the researcher can conclude that the benefits noted as beneficial for learners and participants within the classroom allow for the increased student productivity and learning. These significant benefits also serve as a useful tool to

create learning opportunities for students that need additional support or acceleration while using technology within the classroom.

Discussion of Research Findings

This section of the study will compile all data from the surveys and focus group participation and compare these findings to the literature collected and discussed in chapter two. The conclusions gathered by the five articles used within chapter two will be analyzed against the findings in this study for each research question.

Research Question 1: What are the barriers perceived by teachers in using technology within their individual classroom? In conducting survey research on this question, the following barriers were depicted, by the teachers at ABC Elementary School, as possible deterrents when using technology in the classroom.

According to Carver (2016), proposed barriers of technology use with the highest percentage of agreeance from teachers within the study include availability of equipment (62%), amount of technology (61%), teacher knowledge and skill (24%), location of technology (6%), amount of instructional time (6%), and availability of support personnel (3%). Although Hsu's (2016) study focuses on another avenue dealing with the barriers of technology use, there are still barriers that are identified and research-based from previous projects. Hsu recognized the following as potential barriers in using technology within the classroom, the lack of technology, the lack of access to existing technology, the lack of time to use the technology, the lack of technical support, the lack of leadership support, and the lack of technology skills. In a 10-item online survey, Hsu found that 80% of 430 K-12 in-service teachers concluded that all or some of these barriers were cause for lack of technology integration within their classrooms.

Research Question 2: What are the benefits perceived by teachers in using technology within their individual classroom? In conducting the online survey, the following benefits for technology use were ranked based on effectiveness within individual classrooms.

In recent research, Carver (2016) identified benefits that correlate with the perceived benefits of technology used within this project survey. Some of these benefits include increased student engagement (59%), increased student understanding (23%), increased instructional differentiation (9%), increased exposure to core current content material (5%), and increased opportunities to use research and evaluation skills (3%). The student engagement benefit is comparable to this study, but the other four benefits do not compare to the results compiled using the online survey.

Yesilyurt, Ulas, and Akan (2016) also define benefits of technology use within their study listed in order of importance as increasing the quality of teaching, overcoming the problem of time, presenting the content in different formats, the creation of flexible learning environments, and increasing the academic achievement of students. All of these benefits correlate with the findings from this project study, except for overcoming the problem of time. The majority of participants somewhat disagree with this benefit enhancing technology use for teachers at 2.67 average weighted score.

Research Question 3: To what extent do teachers perceive a relationship between technology barriers and benefits within their individual classroom? In analyzing the focus group responses, in regard to the survey answers, the relationship in reactions to survey versus focus group is similar in perception with barriers and benefits of technology use. The highest ranked barrier of the lack of time to devote to the creation and

implementation of technology integrated lessons (3.54 weighted average) was consistent within surveys and focus group discussion. Participants felt that the time spent learning the new technology or programs was non-productive due to the timing or format of the training. Within this same discussion, some participants mentioned the lack of time to devote to the implementation of technology lessons due to connectivity issues. This barrier, connectivity (3.00 weighted average), resides as the second highest ranked barrier for this study. This data aligns with Carver (2016) and Hsu (2016) research that revealed that the same barriers and benefits provided obstacles and triumphs for teachers when using technology in the classroom. Carver revealed that teachers use technology within the classroom to increase student engagement. Teacher comfort levels play a role in the implementation of technology (2016).

Another barrier, location of technology, was one that did not show much urgency in the survey with a weighted average of 2.50, somewhat disagree that this barrier affects the use of technology in the classroom. In contrast, the focus group had discussion about this barrier. Participants wanted to be more flexible in their grouping and instruction, but the location of the technology or availability causes teachers to abort any idea of using the technology.

The benefits of increasing student engagement and student achievement on the survey correlate to the results of the focus group and was supported in the literature (Carver, 2016). Many participants ranked the benefit of increasing student engagement (3.54 weighted average) superior to increasing student achievement (3.08 weighted average). Participants felt that students are more engaged using technology and did not realize that they were doing work to reinforce academic skills.

The barrier of administrative support created an imbalance between the focus group discussion and the online survey. The focus group discussion identified several reasons that this barrier plays a major role in technology use within the classroom. Some responses to the importance of administrative support include the administrator must provide the resources, support the role within individual classrooms and how that teacher feels about the use of it, administrator must know how to use it too, they must provide professional development that is relevant to the teachers, and the administrator must hold teachers accountable with appropriate use of technology. The survey conducted with the same participants indicated that administrative support for technology use was not a barrier that affected their implementation. It scored a 1.96 weighted average that specifies that participants strongly disagree.

One of the benefits that expresses an interest in saving time and effort for teachers was identified as a low priority item. The survey indicated that most participants somewhat disagree, with a weighted average of 2.67, that it affects technology use within the classroom, however the focus group participants expressed a different reaction. The participants stated the following benefits and barriers are reasons for saving time and effort using technology: creation of content and resources are helpful for years to come when teaching that same academic content; Wi-Fi and connectivity issues cause for frustration and do not save on time; BYOD does not let you function the way you had planned when parents do not let their children bring their devices to school or do not have them to bring to school for use in the classroom; Engrade graded assessments online and allowed for you to remediate immediately; SMART Exchange is a great resource to use for teacher-created materials on standards taught in the classroom or tweak what someone

else has created for your purposes; the amount of resources available is overwhelming a lot of times, and teachers do not know where to begin looking for materials to use in the classroom.

The final and most revealing barrier that indicated a massive discrepancy among the survey and the focus group was the lack of professional development. The survey revealed a 2.50 weighted average of participants somewhat disagree that the lack of professional development plays a role in effecting the use of technology within the classroom. In contrast, the focus group identified the following need for professional development within ABC Elementary School. It was the most requested and discussed question among all of the questions. The participants discussed the following about professional development: They are overwhelmed, scared of it, or time to use the device or program. Hsu (2016) also concluded that one of the major barriers identified in the study was the lack of teacher training, and teachers needed more time to learn the programs. Many times the teachers are presented with information on how to use it but are not given the opportunity to apply the information learned at the training. The time to practice skills learned during professional development are not representative of how we are taught to teach our students; hands-on and interactive not available; professional development should teach a skill and require teachers to go create a lesson with that particular device or program to gain experience and mastery of the skill; observation of other teachers using the skill would be beneficial of those that do not feel as comfortable using certain devices or programs; culture among the young/old and expert/novice users to want to help each other; there needs to be more professional development provided by districts and schools to assist in the implementation and introduction of apps that are

available in education; in-house IDEA fair once a month for specific teachers; skills need list; model lessons with technology; faculty meeting snip-its and presenting technology skills or programs that available for everyone, so they can use it immediately within their classrooms; refresher courses over a period of time; and technology mentors for the year assigned to all teachers.

The researcher presented the major findings from the articles and compared them to see if the results collected in this study were supported or contradicted by the participants' responses. The participants' responses supported Yesilyurt, Ulas, & Akan's (2016) study in reiterating that teacher self-efficacy positively and significantly affects computer self-efficacy. In measuring a teacher's computer self-efficacy, the researcher can predict one's attitude toward applying computer-supported education (2016). The data reported was supported by the expressed concern from participants in this study to learn how to use various components of technology effectively. The participants' self-efficacy affects and knowledge on how to use technology within the classroom with students is evident within the focus group transcript.

The participants' responses supported Domingo & Gargante's (2016) information collected within this study. This research article analyzed the use of technology using mobile applications on handheld devices. The researcher found that this article supported the data collected within this study by emphasized awareness of various content learning apps. available to students. This research study concurred that the use of mobile learning apps. impact student learning on a higher level and engage students at a level that effects student achievement (2016). With this data available, the content discussed during the focus group and survey results are supported with current literature. The participants

expressed the importance of using various applications and software to meet the individual needs of their students which is supported with research.

The participants' responses supported the Brenner & Brill (2016) research article. This research article expressed the need for early teacher education programs to assist teachers throughout their career in provided guidance and professional development (2016). This guidance would consist of continual communication from graduated alumni from the teacher program to assist in providing them with up-to-date resources on how to use technology within the classroom (2016). Participants within this study expressed the same concerns during the focus group and survey results. The participants lack time to develop and create lessons that incorporate technology within the classroom. They need guidance and training to increase their comfort level in using the technology, in order to decrease the amount of time it takes for the implementation of this type of instruction.

The participants' responses supported the Carver (2016) research article. This research article conveyed barriers that still pose a problem for educators seeking to use technology within the classroom and highlighted benefits (2016). Carver found that technology availability and time were a concern for educators, along with teacher knowledge and skill. The major benefit identified within the research study included the increase in student engagement when utilizing technology within the classroom (2016). The availability of technology was a concern that was expressed by participants within this study, and the student engagement benefit was a benefit supported by the data collected too.

The participants' responses supported the Hsu research article. This research article communicated the importance of technology use by teachers in the field, but it

also exposed some of the barriers that the teachers faced while trying to accomplish this task. Teacher barriers were identified a lack of technology and a lack of access to existing technology. Hsu also exposed students' and teachers' knowledge of technology hindered the use within the classroom, along with the teacher's lack of time and training to implement technology to the full potential (2016). All of these barriers support the data collected within this study to be valid.

Conclusions

The purpose for this study was the answer the following research questions. While gathering the necessary data to answer the following research questions, the researcher concluded that there are many inconsistencies with the benefits and barriers. This inconsistency of data supports the literature available about technology use with no change.

Research Question 1: What are the barriers perceived by teachers in using technology within their individual classroom?

Research Question 2: What are the benefits perceived by teachers in using technology within their individual classroom?

Research Question 3: To what extent do teachers perceive a relationship between technology barriers and benefits within their individual classroom?

With research question one, the researcher conducted quantitative research that was collected through the use of surveys about the perceived barriers that effect the use of technology within the classroom. The data collected on barriers had an overall 7 score of 2.67 which indicated that participants somewhat disagree. This meant that the participants found that the barriers do not play a role in influencing their perception in the

usage of technology within the classroom. In table 34, the barriers used within the survey have been linked with their Likert category based on the participants' responses. The scores indicated that the participants do not believe that the barriers mentioned play a role in affecting the use of technology within the classroom. Clusters of barriers seem to focus around the intended use of the technology. There were clustered barriers mentioned in reference to one another in the focus group. The lack of time, connectivity, availability of technology, amount of technology, location of technology, and the evolution of the equipment were declared barriers that prevented the participants to use technology within the classroom to its full capability with students. The participants used the technology independently for their academic and professional responsibilities but found it difficult to use with students to support instructional purposes within the classroom. The lack of time and their comfort level in solving technical issues and implementing technology in the classroom setting for instruction seemed to cause difficult for the participants. The conclusion observed by the researcher expressed the need to increase the comfort level of users must be addressed with participants with professional development to increase teacher knowledge in order to decrease the amount of time it will take to create and implement technology use within the classroom. If the participants' comfort levels increased, then the intended outcome would be the decrease in time for developing meaningful usage for classroom use.

In research question two, the researcher conducted quantitative research that collected data via survey format about the perceived benefits that effect the use of technology within the classroom. The data collected on benefits had an overall 7 score of 3.32 which indicates that participants somewhat agree. This means that the participants

found that the benefits do play a role in influencing their perception in the usage of technology within the classroom. In table 35, the benefits used within the survey have been linked with their Likert category based on the participants' responses. The scores indicate that the participants do believe that the benefits mentioned play a role in affecting the use of technology within the classroom.

The participants conveyed to the researcher through the data collected that technology is a useful tool to create learning opportunities for all learners within the classroom setting. They also communicated that technology use within the classroom increased student productivity and learning for learners. These conclusions were based upon their survey results. Participants linked the benefits of increased research skills, differentiation, flexible learning environment, increased student engagement, more current content availability, collaborative learning, communication, creativity and self-expression, and increased student achievement to providing learners with notable returns when using technology within the classroom. While these benefits were found beneficial by participants, the barriers mentioned seem to undermine the use of technology within the classroom.

Within research question three, the researcher conducted qualitative research that collected data using a single focus group session that dealt with the questions about the perceived benefits and barriers and how they affect the usage of technology within the classroom. The barriers and benefits were analyzed for possible relationships among the answers received through the focus group. For each barrier, there were benefits that were mentioned throughout the focus group by participants that correlate and vice versa for the benefits. Therefore, the data provided by the focus group revealed that the benefits and

the barriers play an equal role in the perception of the effect of technology use within the classroom. Table 10 lists the benefits with barrier relationships and barriers with benefit relationships for easy reference. Although these benefits and barriers correlated with one another, the barriers seemed to overpower the perceived benefits identified by the participants and identified with the collected research.

Implications

The research within this dissertation could be used to evaluate the use of technology within classrooms among elementary schools and to assist in the development of a professional development plan that meets more frequent with observation and project-based participation. Within the study, the participants continuously stressed the need for more time to devote to the creation of technology integrated lessons for students. With the yearlong professional development session, participants would have the opportunity to work on units of study that could incorporate many benefits that were identified as beneficial during this study.

This research would inform a group of individuals pertinent to the change that needs to occur in order to implement more technology integration within schools. Educators will be informed by this study in order to make decisions that could change the course of their integration process. Administrators of schools will be informed by this study in order to assist in the change of instructional delivery and support educators with appropriate resources. Lastly, district level employees will be informed by this study in order to change policy and requirements that equip our students for the 21st century.

Limitations

The size of the focus group provided difficulty for the researcher. During this session, there were a total of 21 out of 24 participants present within one single focus group. The experience gained from the executed focus group for this study revealed that a smaller group and more sessions were needed to allow all participants a chance to convey their perceptions about technology use within the classroom. The researcher would conduct 3 to 4 focus groups with a total of 8 to 10 participants in each group in future research encounters.

The demographic make-up of this study should be considered a limitation. Table two identifies the areas of the population that cause concern. The gender of the population consisted of females only. The age of the participants were 26 and older. Lastly, the race and ethnicity of the participants were white with no Hispanic background. All of these identifiers could serve as a possible limitation that may need further attention.

Recommendations

The researcher is providing recommendations for this study based upon the limitations mentioned earlier.

1. The researcher recommends that the Teacher Keys Effectiveness System used within the State of Georgia to evaluate teachers should reevaluate the technology standard to require more integration within the classroom.
2. The researcher recommends a study to examine the attitudes toward technology use within the classroom of middle and high school teachers.

3. The researcher recommends that the administration of schools take into account the research findings for further planning of technology integration within classrooms.
4. The researcher recommends that adult learning theory be analyzed and studied to grasp a better understanding of how adults learn. This will aid in the redelivery and professional development administered to the participants about technology integration.

Further Research

1. The researcher recommends further research after implementing this study to evaluate and analyze why the barriers outweigh the benefits in using technology within the classroom.
2. The researcher recommends further research to compare and contrast teacher perceptions of the benefits and barriers about the use of technology within individual classrooms within the school district studied and other rural and urban school district settings.
3. The researcher recommends further research to assess the resistance identified by participants using a case study of these individuals.

Dissemination

The data collected within this study will be disseminated with the following entities.

1. The researcher will request to share the results of this study at an invited time with the superintendent and principal of ABC Elementary School.

2. The researcher request the opportunity to present the results of this study during a general administrator's meeting.
3. The researcher planned to share the results of this study with the stakeholders present at a scheduled meeting of the board of education for the participating school district during an invited time.
4. The researcher planned on presenting this study at the Georgia Educational Technology Conference.
5. This dissertation will be available on the web through Columbus State University's library system.
6. The researcher will attempt to publish this dissertation within the Journal of Technology and Teacher Education (JTATE) and other like journals.
7. The researcher request to share the results of this study with the Georgia Educational Research Association.

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Appendix A

Survey Instrument Used in Research

TEACHERS' PERCEPTIONS OF THE BENEFITS AND BARRIERS ABOUT THE USE OF TECHNOLOGY WITHIN INDIVIDUAL CLASSROOMS

Please use the following force scale below to indicate the effect associated with the use of technology within your classroom.

1	Strongly disagree	2	Somewhat disagree	3	Somewhat agree	4	Strongly agree
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BARRIERS	To what extent do the following <i>barriers</i> affect the use of technology within your classroom.				BENEFITS	To what extent do the following <i>benefits</i> enhance the use of technology within your classroom.			
Availability of existing technology	1	2	3	4	Increased student engagement	1	2	3	4
Amount of technology	1	2	3	4	Increased student achievement	1	2	3	4
Location of technology	1	2	3	4	Method of differentiation	1	2	3	4
Lack of time to devote to the creation and implementation of technology integrated lessons	1	2	3	4	Opportunity to work on researching skills	1	2	3	4
Technical support	1	2	3	4	Provides more current content information	1	2	3	4
Teacher knowledge and skill	1	2	3	4	Creates a more flexible learning environment	1	2	3	4
Students' lack of technology skills	1	2	3	4	Promotes collaborative learning	1	2	3	4
Lack of professional development	1	2	3	4	Saves time and effort	1	2	3	4
Lack of software available	1	2	3	4	Helps me organize my work	1	2	3	4
Connectivity issues	1	2	3	4	Promoted teacher-student-parent communication	1	2	3	4
Evolution of the equipment	1	2	3	4	Promotes creativity and self-expression	1	2	3	4
Lack of administrative support	1	2	3	4	Improves retention rate	1	2	3	4

(Brenner & Brill, 2016; Carver, 2016; Coleman, Gibson, Cotton, Howell-Moroney, & Stringer, 2016; Domingo & Gargante, 2016; Hsu, 2016; Preston et al., 2015; Yesilyurt, Ulas, & Akan, 2016; Young, 2016)

Appendix B

Appendix B

Focus Group Questions

FOCUS GROUP QUESTIONS FOR FOLLOW-UP AFTER THE SURVEY

The following focus group questions will be supplied to the teachers participating in the study.

How does time prevent the creation and implementation of technology integrated lessons?
Does the location of technology play a role in the utilization?
How does the use of technology play a role in student achievement and student engagement?
What role does the administrator play in using technology within your individual classroom?
How does the use of technology create a more flexible learning environment?
How does the use of technology play a role in the retention rate of student understanding?
How could the lack of software available to students and teachers affect instruction?
How does the use of technology save time and effort within the classroom?
What organizational tools do you use with technology that assist you in the classroom?
Why would professional development cause a teacher not to use technology within their classroom?
How does the teacher's knowledge and skill correlate with professional development of technology use within the classroom?
What skills do student's lack in using technology within the classroom?

Appendix C

Appendix C

CSU IRB Approval

Institutional Review Board
Columbus State University

Date: 6/6/17
Protocol Number: 17-095
Protocol Title: Teachers' Perceptions of the Benefits and Barriers about the Use of Technology Within Individual Classrooms
Principal Investigator: Jodi Head
Co-Principal Investigator: Michael Richardson

Dear Jodi Head:

Representatives of the Columbus State University Institutional Review Board have reviewed your research proposal identified above. It has been determined that the research project poses minimal risk to subjects and qualifies for expedited review under 45 CFR 46.110.

Approval is granted for one (1) year from the date of this letter for approximately 24 subjects. Please note any changes to the protocol must be submitted in writing to the IRB before implementing the change(s). Any adverse events, unexpected problems, and/or incidents that involve risks to participants and/or others must be reported to the Institutional Review Board at irb@columbusstate.edu or (706) 507-8634.

You must submit a Final Report Form to the IRB once the project is completed or within 12 months from the date of this letter. If the study extends beyond 1 year, you must submit a Project Continuation Form to the IRB. Both forms are located on the CSU IRB website (<https://aa.columbusstate.edu/research/irb/>). The completed form should be submitted to irb@columbusstate.edu. Please note that either the Principal Investigator or Co-Principal Investigator can complete and submit this form to the IRB. Failure to submit this required form could delay the approval process for future IRB applications.

If you have further questions, please feel free to contact the IRB.

Sincerely,
Amber Dees, IRB Coordinator
Institutional Review Board
Columbus State University